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Recession Infecting DP Budgets?

Last week's holiday may have been the last chance for DP managers to feel thankful for a while, since budgets of most organizations apparently will hardly keep pace with rising inflation rates next year.

Overall, DP budgets are expected to rise an average of only 10.5% next year, approximately equivalent to the present rate of inflation in the U.S., according to a recent *Computerworld* survey.

And even though that average appears to keep up with inflation to some extent, over half of the limited sample survey reported that their increases would be under 10%.

The picture is even bleaker than at first blush, since a great deal of the increases will be caused by rapidly inflating paper costs and cost of living salary increases, leaving little in the budgets for increased hardware expenditures or new applications developments that don't promise quick cost reductions in other business areas.

Faced with this prospect, the randomly surveyed users indicated they were looking to reduce paper costs, keeping older equipment in operation longer than planned and considering only those applications that promised quick payoffs in other operating areas.

In the area of hardware, users willing to give specific figures showed an average increase of only 5% expected for next year. And most of those who said their budgets would increase attributed the rises to increases in rental or maintenance rates

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Resolutions 'Ignored' for Two Years

Where Is IBM's VM/370 Help? Share Group Asks

By Don Leavitt
Of the CW Staff

MONTREAL – Where is IBM's Virtual Machine facility (VM/370) heading? Why won't IBM respond to user's concerns about the facility?

These questions haunted Bruce Marshall, VM project manager of the IBM users group Share, as 30 to 35 members of the project got together here last week in a mini-Share meeting. "But IBM didn't even bother sending anyone to talk to us," he said.

The project membership had submitted some 95 resolutions to IBM over the past two years seeking clarification or additional support, he said, emphasizing that his frustration at the vendor's unresponsiveness is not a sudden thing.

The latest resolution charges simply that "IBM is not supporting its product in any manner." That summed up the situation so well, he said, it came to the top of a pile of more specific concerns when the project leadership attempted to prioritize the items to be considered here.

Even though some of the earlier resolutions have been "accepted" by IBM, the project has yet to see any results from the vendor. It is a very slow process of evolution, slower than in almost any other Share project, Marshall said.

Six Faulty Areas

The latest criticism faulted IBM for six specific areas of unresponsiveness. Chief among them was IBM's failure to make new devices available to VM users. Marshall noted, for example, that the 3340 data module may now be supported by VM, but it certainly wasn't when the 3340 was first announced, even though the device would be a very nice one for VM.

Customer education facilities are poor, the resolution said. "IBM doesn't have very many classes. They don't have an operator training class. The don't have, in general, the comprehensive support for user education for VM," Marshall argued.

Field engineering support for maintenance and "fixes" was another area cited by the resolution as needing more attention. A branch office will not have the depth of personnel it should have. "They'll have one person trained in VM and if he goes away to school that's the end of it," the project leader charged.

Customer engineers (CEs) are "very wary" of VM. The facility is supposed to be very good for doing on-line hardware diagnostics, but "most CEs will not trust it," Marshall went on.

An outgrowth of the CP/CMS operations originally implemented on the 360/67, VM/370 with its CMS time-sharing subsystem has been growing in user acceptance, Marshall indicated.

There had been about 900 copies of the latest VM release shipped from IBM's Program Information Department, he noted.

Of these, he estimated 400 or so are installed and being used in a production environment. The other shipments went to people who are "intrigued with the system and who get it in to try. The system programmer tries it and plays with it. It may catch on; it may not," he explained.

The machine base figures, accurate in Marshall's view although he wouldn't reveal his sources, are 10%, 370/135s; 50%, 145s; 30%, 155s and 158s; and another 10%, 165s and 168s. These obviously represent a "substantial amount of hardware rental dollars," he noted.

'Poor Man's TSO'

IBM's original market probably was the DOS user on the 135 or 145 who wanted time-sharing, Marshall thought. The CMS subsystem would allow him to have "a poor man's TSO."

The VM facility, which supports simultaneous use of DOS and OS along with CMS, might also be seen as a bridge product for some users moving from DOS

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IBM Satellite Plans Hit As FCC Holds Hearings

By Ronald A. Frank
Of the CW Staff

WASHINGTON, D.C. – IBM has the power to control the future success of domestic satellite services.

This was the consensus of opinion during oral arguments held last week before the Federal Communications Commission (FCC), which is considering IBM's potential entry into the satellite field.

The session was held to discuss the merger proposal of IBM and Communications Satellite Corp. (Comsat) that would create a powerful satellite service carrier for U.S. data and other users.

The dominance of IBM in its native DP industry was mentioned frequently during the all-day proceeding before the commission. In this regard, for example, Western Union (WU) told the commission that data communications are vital to the success of satellite services.

Any company that provides satellite communications "will have to get a substantial portion of IBM's [DP] customers or it will go broke," said William Warfield Ross, the WU attorney.

Some participants said approval of IBM and Comsat as a satellite carrier would create a monopoly in data communications that would severely restrict the ability of other carriers to survive.

And several companies suggested that the FCC should order full "evidentiary hearings" to determine exactly what type of services IBM intends to provide.

Sherwood Lewis, speaking for Sanders Associates, cautioned the commission that the government's antitrust suit against IBM was directly related to IBM's satellite application.

"IBM is facing a major breakup," Lewis said, "and this makes its future so uncertain" that the commission could not ef-

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Both Houses Pass Privacy Bills; Compromise Conference Planned

By Nancy French
Of the CW Staff

WASHINGTON, D.C. – Two separate privacy bills, one passed by the House of Representatives and the other by the Senate, may face an early death unless a conference committee can iron out the differences between them before the 93rd Congress goes out of business next month.

To become law the same bill must be approved by both houses.

Both bills establish procedures and safeguards for collecting and maintaining manual and computerized files of personal information by the Federal Government and certain other parties, such as in the case of "federally assisted" programs. The Senate bill also applies to federal contractors.

The most significant difference between the bills concerns a proposed privacy commission. While the Senate approved a privacy commission to oversee implementation of the law and propose future legislation for the private sector, the House not only failed to include such a commission but officially defeated an amendment proposing one.

This firm demonstration of opinion on the part of the House may make it impossible for House conferees to approve the commission when the time comes to meld

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Please address all correspondence to the appropriate department at 797 Washington Street, Newton, Mass. 02160. Phone: (617) 965-5800. Telex: 92-2529.

OTHER EDITORIAL OFFICES: Los Angeles: 963 N. Edgecliffe Drive, Los Angeles, Calif. 90026. Phone: (213) 665-6008. Europe: Computerworld, c/o IDC Europa, Ltd., 140-146 Camden Street, London NW1 9PF, England. Phone: (01) 485-2248/9. Asia: Computerworld, c/o Dempa/Computerworld Company, Dempa Building, 1-11-15, Higashi Gotanda 1-chome, Shinagawa-ku, Tokyo 141. Phone: (03) 445-6101. Telex: 26792.

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President/Publisher — Patrick J. McGovern
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'In Holding Pattern'

DP Managers Prepare for Bleak Year

DP managers are buttoning up their coats and pulling down their hats as if they were walking into a long, cold winter.

They are showing a new application of their old mainframes, an aversion to hiring and a concern about keeping their level of DP service up when their budget dollar suddenly buys less, a recent *Computerworld* survey found.

"We're in a holding pattern," one user said, describing a situation that seems typical of many DP shops for the coming year. "While we aren't putting in new applications or equipment, we hope to make good use of the time to consolidate and refine existing applications," he added.

Depending on the industry they work in, some DP managers are more at ease than others. "There's not much difference in our plans except everything will cost more," one insurance company vice-president remarked.

But a luggage manufacturer commented, "We're right between battening down the hatches and lightening the cargo."

The director of information processing for a toy company noted "I would say definitely that last June we were in an expansion effort – not now."

One DP manager rather grumpily said his peers had been used to buying up the latest "new-fangled equipment" for years but are now learning to ask, "What's its unit/throughput costs?"

Users spoke of enhancing and holding on to their 360s to last until the next computer generation. Others plan to downgrade from 370s to 360s:

"We're trying to make do with what we have," one DP manager said, echoing the views of several others. "If it's possible to bypass the 370 era we will try to do so either by renting used equipment or by holding on to what we have with as few add-ons as possible."

"Because we can't buy new hardware, we have to extend our existing system as far as possible," another mentioned.

Independent vendors and third-party lessors are looking a lot better, too. Several users said they were ready to venture from the IBM fold for the first time.

Computer output microfilm (COM) has also never looked better to users stunned by rising paper costs. One university DP center's paper costs went up from $50,000 to $125,000 in the past year.

DP managers often budgeted 20% to 30% more for paper in 1975, but were uncertain on how much prices would actually rise. "It depends on what the paper companies hit us with," remarked one.

In this light, a startling number of DP administrators said they were planning, considering or had already implemented COM applications.

A smaller number of DPers reported that CRTs were beginning to appear as a more cost-justifiable alternative to paper now, too.

Other users expressed a new interest in diskettes because of the cost of paper products.

One DP manager remarked that the paper price hikes had not changed plans at his shop; it had only led to a "lot of bitching."

This CW report on the budgets of data processing departments for the coming year was prepared by staffers Catherine Arnst, Ann Dooley, Nancy French, Edith Holmes, E. Drake Lundell Jr. and Patrick Ward.

DP administrators at state universities seemed to feel that the coming year would make it especially difficult for them to provide a level of service comparable to previous years.

One university DP director spoke of the public's "continued disillusionment with their perception of our performance," primarily because "people don't see that the computer is more than a fast accounting machine."

In general, the main concern for the coming year is to keep levels of service up, even though costs have outpaced the budget DP managers have at their disposal.

"There's not much doubt that the quality of service is going to suffer in an organization that runs relatively lean to begin with," said the luggage firm manager.

But the DP director of a university felt that "people will want to keep their jobs – and they'll have to be more productive to do it." This will help DP centers maintain services in the face of budget cuts, he added.

But budget pressures on DP staffing are complicating the efforts of DP administrators either to keep their services steady or to expand them.

While none of the DP administrators spoke of layoffs, few spoke of heavy hiring.

New hires "are out of the question," a university DP manager remarked. But the more common response was that of the director of information processing for a manufacturing firm who said, "If someone leaves we'll go through a more rigid process before replacement."

Another DP director for a manufacturing firm noted he hopes his personnel costs will decline next year as "attrition takes care of some big technical guns. Hopefully the impact will be on less crucial departments," he remarked.

Though they are doing less hiring, the DP managers surveyed plan to pay their people more. In most cases, though, the boosts will barely keep up with inflation and in many cases they will be less.

"Wages are increasing more rapidly than they normally would in an effort to help people out," a university administrator said.

Surprisingly, a Los Angeles area DP manager remarked that he's raising salaries because "we have to be competitive salary-wise in order to keep people."

But cost-of-living raises ranging from 6%, 8%, 10% and up to 15% seemed to be more common.

One university administrator proposed pay increases of 10% over an employee's first $10,000 income, 7.5% over the next $6,000 and 5% for every $5,000 after that.

Then again, "there's no point in starving DP so the shop will be weak when business gets better," said the manager of operations and software for an appliance firm. Competitors can jump ahead in that situation, he said.

The DP managers did not show any unanimity on whether they planned to cut back on developmental work. If they were planning new applications, they seemed to be of the cost control or cost cutting kind, with relatively quick payback.

One firm wants to "add applications that will save manpower – we want to keep staff needs at a minimum," a DP official said.

Manufacturing firms showed a higher than average interest in adding new applications. The manager of computer services for a Wisconsin manufacturer said his firm is launching a major order entry application. The company is also going into materials requirements planning and other factory information systems "which should save money in the long run."

Recession Infecting DP Budgets, Survey Indicates

(Continued from Page 1)

mandated by the mainframe manufacturers.

The result is that little would be available for any new expansion in terms of equipment, and most of the users surveyed said they will once again take a hard look at ways to save on hardware dollars.

For example, several DP managers indicated they were considering replacing currently installed 370 equipment with less expensive 360 machines, and several others noted they had decided to pass up the 370 all together in order to keep prices down.

Salary increases will average 9.4%, the users said, due overwhelmingly to cost of living increases to present personnel, even though almost half of the survey audience said they would like to hire new personnel.

On a chilling note, at least one manager reported he would stabilize his salary budget at last year's level by cutting personnel in proportion with his cost of living salary increases, and another was "hoping" attrition would keep his total salary budget down.

Almost all of the users said cost of supplies – primarily paper – had risen significantly, adding that paper costs last year rose by between 50% and 200%.

With these price rises facing them, the users projected total supplies budget increases of from 2% to 30%, with such a wide range of percentages making an average meaningless.

Many of the users surveyed said they were investigating ways to reduce paper costs through the use of computer output microfilm, more print positions per line or the outright elimination of many reports.

Only 25% of the users surveyed said they planned to spend an increased amount next year on outside software. Over 50% indicated they would hold the line on outside software and the remainder consisted primarily of users who do not use such assistance.

Interestingly, those planning increased expenditures on outside software also plan to add new applications in the coming year – and most of the new applications work is apparently planned in areas that will pay off in reduced operating expenses or tighter control over inventories.

In all, 60% of those surveyed said they would add applications to their systems next year, while the remainder had no plans for new applications work.

However, many of those planning new applications stressed these would only be small additions and would call for only minimal increases in budget to implement.

Almost half of the firms planning new applications were concentrated in the manufacturing segment of the business.

In the area of communications, 50% of the users reported they expected to increase expenditures next year, but few would give expected percentage increases.

Most of those expecting increases indicated that communications would be used to expand computer services to a wider base of users within their organizations at a minimum of extra costs.

Once again most of the users reporting increases in the communications budget for the coming year were concentrated in the manufacturing area, where many of the planned new applications call for increased communications capabiltiy.

In addition to manufacturing, the survey also included users in retailing, insurance, banking, transportation, diversified finance and education.

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Senate, House Pass Privacy Acts; Compromise Conference Planned

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the two bills, one observer said.

The House passed the Moorhead Bill (H.R. 16373) by a vote of 353 to 1, and the Senate approved the Ervin Bill (S. 3418) 74 to 9.

Key Amendments

Key amendments added when the bills reached the floors of both houses concern limitations on use of the Social Security number, previously omitted from both bills, protection of third-party informants who talk to agencies "in confidence" and restriction of punitive damages in the event of violation.

Specifically, the House added: a "moratorium on the use of the Social Security number" which forbids federal, state and local governments from denying any right, benefit or privilege provided by law to individuals who refuse to disclose their Social Security number.

Use of the Social Security number is also restricted by the House bill to "verifying the identity" of an individual "unless otherwise authorized by federal law."

However, the amendment has a grandfather clause exempting information systems "in existence and operating" prior to Jan. 1, 1975 and where disclosure is "required by federal law."

With regard to protecting confidential sources, another House amendment calls for protecting sources, in cases where the government "pledged confidence" in obtaining the information, but it does not protect the information provided.

Senate Additions

In the Senate, there were still more amendments.

Concerning the Social Security number, a Senate amendment forbids "any business, private corporation or government agency" from requiring persons to disclose their Social Security number or "enforce that disclosure by denying rights, benefits or commercial transactions to those who refuse." Systems in existence as of Jan. 1, 1975 are not affected.

With regard to confidential third-party informants, an amendment was passed authorizing that the nature of such information be provided to data subjects without the name of the informant. In cases where the information becomes an issue in a legal proceeding, those details would be made known.

This amendment also prohibits use of investigative or background files in federal employment screening except in cases where a person would be going from a job requiring no security clearance to one requiring clearance.

Agencies must respond to requests to access their files within 60 days.

Privacy safeguards in the Senate bill were extended to the private sector in cases where data files are "operated by or on behalf of federal agencies" in an effort to cover the gap between government agencies and any service bureaus they may employ.

Civil liabilities against individual federal employees were amended, punitive damages were struck and "liquidated" damages added that would award a minimum of $1,000 to an individual who can show damages.

One amendment specifically prohibits the Census Bureau from transferring any identifiable information it collects to other agencies.

Another amendment was passed authorizing the privacy commission to draft model state legislation and to make available technical assistance to states wishing to draft such legislation.

To ease housekeeping burdens agencies might experience in attempting to update and clean out their files, another amendment was passed by the Senate delaying file updating to such time as any individual file is used, disseminated or updated.

Federal Government Practices Limited

WASHINGTON, D.C. – With or without a privacy commission to implement and enforce a privacy law, both privacy bills recently passed by Congress place the following limitations on the Federal Government's collection and use of personal information:

- Only relevant personal information may be collected and the individual from whom the data is obtained must be informed which data is required, which is voluntary and why it is needed and by what authority.
- Only timely data may be maintained and disseminated; records must be kept of outside access to the data, and managerial and physical security must be established.
- Descriptions of each type of data bank maintained must be published; the establishment of any new data bank requires a published privacy impact statement.
- Individuals must be allowed to access and inspect their records and be told how the information is used.
- Records challenged by individuals must be reinvestigated and corrected; hearings must be granted to resolve any disputes.
- Individuals who can prove damage are entitled to limited damages payment.
- The government must obtain the consent of involved individuals before information is shred with an agency other than the one which collected the data, except when the data is unidentifiable and for statistical purposes.
- The use of the Social Security number is limited.

IBM Satellite Plans Attacked

(Continued from Page 1)

fectively make a decision on the Comsat/IBM merger proposal. The FCC should establish a dialog with the Justice Department and Judge David N. Edelstein, who is hearing the government's antitrust suit, "because you may have a consent decree staring you in the face soon," he warned.

In case of an IBM breakup no one knows what form the successor company would take and how it might provide satellite services, he added.

FCC Chairman Richard Wiley assured Lewis that the commission "is aware of the current antitrust posture of IBM."

Secondary to Voice

Minimizing the potential impact of an IBM satellite carrier, Nicholas De B. Katzenbach told the commissioners that data communications services would be secondary to voice facilities in the early years.

"There is no way [the proposed carrier] can make it on data alone; we believe we can develop a digital capability for voice as well as data," the IBM counsel explained.

IBM's lack of experience in communications and in the area of regulation led it to propose the merger with Comsat, Katzenbach told the commissioners.

When asked by Commissioner Robert E. Lee how many satellites could be supported both from an economic and technical viewpoint, Katzenbach said he did not know. Lee said this would be important to determine how many firms could successfully provide satellite services to users.

"IBM comes from a competitive business and our concern is not whether there is enough business for everyone, but whether we can build a better mousetrap. And if we can, then [competing with IBM] is somebody else's problem and not ours," Katzenbach answered.

Several participants registered concern about the interface that would be used by IBM to connect its DP equipment for a Comsat/IBM satellite.

"It may not be possible for WU to be compatible with the satellite/CPU interface," Ross warned, and he cautioned that the commission has no control over this DP interface.

Ross also said IBM could provide a total bundled equipment/communications service to users. IBM could then charge a very low rate for the satellite portion of the service, perhaps at only a 1% or 2% profit for the first five years.

Such a price would exclude other carriers and the FCC would be hard pressed to make IBM raise its rates, he claimed.

'Most Anticompetitive'

Appearing for the Federal Trade Commission, James T. Halverson called the proposed Comsat/IBM alliance "the single most anticompetitive method of entry for IBM." He said the FTC would prefer to have Comsat find another partner so IBM could become a satellite carrier by itself. This would require Comsat and IBM to compete against each other, he implied.

Data Transmission Co. (Datran) said the proposed satellite company will be IBM mainly and information will pass freely between IBM and its satellite subsidiary. IBM will offer a second generation satellite that will not be compatible with other satellite systems, he said.

"IBM is telling [the FCC] that the DP industry is none of your business," but Datran is worried about the lack of substantive information that has been submitted, Datran attorney Don Elardo said.

Southern Pacific Communications said it would feel a lot better about the proposed Comsat/IBM satellite carrier if it had an equal one-third share along with the two firms. SP had proposed this idea only to be rejected by IBM, Herbert Forest, the SP attorney, said.

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IBM's Cary Repudiates 'Counterterrorist' Training

By E. Drake Lundell Jr.
Of the CW Staff

ARMONK, N.Y. – An IBM "management or manager failure" was responsible for the inclusion of a "counter-terrorist" program in a recent training course for some of the firm's security officials, Frank T. Cary, board chairman, said last week in repudiating the course.

In all, 19 security officials, primarily from the U.S. but with some foreign representation, attended the course in which the firm was urged to set up an intelligence system in order to track radicals that might be planning disruptions, bombings or kidnappings in IBM facilities, IBM said.

In an interview, Cary, who described the material as "completely inappropriate," said he was surprised that no one attending the course objected to it or realized that its inclusion in the course was completely wrong.

Although the plan was developed for IBM by the International Association of Chiefs of Police (IACP), Cary placed none of the blame for the material on that group, but rather on a management breakdown within IBM.

The officials in charge of the course, he said, were authorized to use the IACP as consultants but failed to properly review the material submitted by IACP for the course.

The document used in the course – "Security: A Management Style, A Course of Instruction in Corporate Protective Services, IBM as a Target for Terrorists" – cautioned the firm against responding to terrorism with similar tactics.

But it added IBM could be a target for terrorists because of its position as the top international computer maker and urged the development of a counterintelligence network under top management direction.

This network should be led by an action directorate "which exists in close liaison with top management," the report said, to coordinate the company's response to any threats.

"It is absolutely critical to any response that the surprise component be reduced and that [IBM] have timely, comprehensive intelligence information on likely threats," the report said.

The course also recommended the possible use of "clandestine operatives" and "the right kind of provocateur" in order to provoke radical organizations into "precipitous, unprepared action."

The report, which the IACP said had been tailor-made for IBM, also indicated that since IBM has "successfully resisted unionization" it might become the target for "increasing radical-led political activity" within its labor force.

This, the report said, could show up in "work slowdowns, active disruptions and sabotage, and nonnegotiable demands on nonwage issues such as day care centers for dependents, women's and minority rights, use of drugs and the general conditions of labor."

Cary said he was "shocked" by the document and labeled it "repugnant" to IBM. In addition, he ordered the material never used again and the attendees of the course were told to return the document, he said in the interview.

The material was used only because of a series of errors, he said, adding: "The material is offensive and I want to make it clear that it doesn't reflect IBM management's policy, concerns or attitudes."

Questioned further, Cary said the purpose of such courses should be to foster techniques to keep IBM plants physically secure and to protect sensitive engineering drawings or other material valuable to competition.

Such things as terrorist activity, including bombings and kidnappings, are police matters, he said, indicating the police around the world were more than adequate for those tasks.

Existence of the course, which was conducted from Nov. 4 to Nov. 15 at IBM's Management Development Center in Glen Cove, N.Y., came to light through reports in the *Berkeley Barb*, an "underground" newspaper in Berkeley, Calif., which received some of the course materials from undisclosed sources.

Share Bemoans Lack of VM Aid

(Continued from Page 1)

to OS. Or, Marshall suggested, it might be a good systems tool, allowing a user to phase in a new release of an operating system while still running jobs on the old one.

Looking ahead, he said he could see the Control Program portion of VM/370 as the cornerstone of IBM's Future Systems. The CP would be the emulator for the 370 on the new hardware, allowing multiple virtual 370s to be run as the users get used to the new architecture.

If that is the case, he recognized, IBM might well be reluctant to add "every bell and whistle we ask for" to make the 370 itself more attractive.

Marshall admitted that during the first year of the Share VM project, they had fairly good responses from IBM. The vendor accepted many of them even though a number of the responses were that IBM would include the subject of the specific resolutions in its "future considerations," Marshall noted.

But the good feelings lasted only until a Share meeting in Chicago last August when IBM in effect rejected better than half of the remaining resolutions, he said. The vendor actually made many of the resolutions part of its "long-range considerations," a new term meaning – to Marshall – that IBM had "put the proposal in its desk drawer, to pull out only if they have the resources at some future time to take another look."

The project leadership had quite a row with IBM at that meeting, Marshall said, "and then we came to this meeting and they don't even send anyone." There were better than 90 VM users at the Chicago meeting, "and I suspect we'll have more than 100 at the Los Angeles meeting in March – if we even meet as a project then," he said with obviously mixed feelings.

IBM said it would not comment on the remarks.

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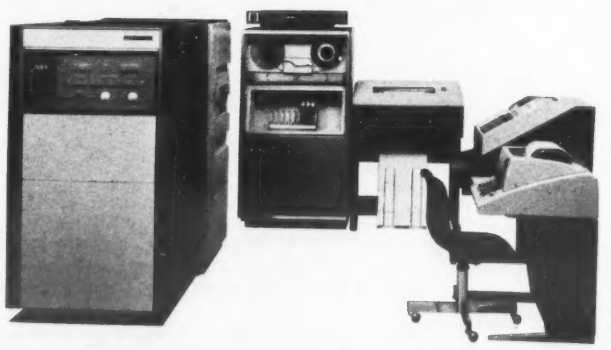

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In More Ways Than One

Prisoners Find Programming Pays Off

By Patrick Ward
Of the CW Staff

FRAMINGHAM, Mass. – The Massachusetts Correctional Institution here (MCI-Framingham) is an old prison, but inside there is a gleaming computer center and a carpeted programmers' room with wood-paneled walls.

This is not the result of state largesse, however. The inmates of this minimum security, coed prison built these rooms themselves, using money earned in their own service bureau business to pay for materials and outside labor.

Called Con'puter Systems Programming (CSP), the inmates' service bureau aims at providing supplementary service to both government agencies and private business. The inmates work on a 32K Honeywell H200 computer system recently installed on permanent loan from Honeywell. That company also certifies CSP's programmers, who learn their more advanced skills from Honeywell volunteer instructors.

Diane M. Dixon, who is beginning the DP training course, looks over tape drives in CSP's computer room.

Before installation of the H200, the inmate programmers keypunched work on card decks which they sent to the client computer site to be run. Results went back to the inmates for corrections.

The in-house computer allows Framingham inmates to process inmate payroll, compile mailing lists for inmate organizations and do statistical work on the state's parole system. It also permits the DP training program to expand into computer maintenance and operator training courses.

Free Work

The Framingham programmers originally did programming for state and municipal government at no charge. Estimated savings to these clients has amounted to more than $1.8 million over six and a half years, even after deducting the cost of keeping a person in prison (estimated at $12,000/yr in Massachusetts) and the inmate's wages of up to $1.50/day.

CSP, after a year in operation, continues to do free work for its original clients but charges its newer ones. After deductions for room and board, part of the earnings are plowed back into the operation and the rest goes into inmate accounts depending on the individual's responsibility at CSP.

CSP's programmers, at P.O. Box 626, 01701, work in Cobol, Fortran, Easycoder, RPG and BAL for a variety of user machines and can do disk programming, systems analysis and design and operating systems work, an inmate said.

Self-Perpetuating Program

DP training in Massachusetts prisons began in 1967 when Honeywell responded to an inmate-initiated request for such courses. The company put Malcolm D. Smith, a teacher and programmer, in charge of setting up the self-perpetuating program.

The first step was an aptitude test given to all interested inmates at MCI-Walpole, a maximum security prison. When the students in that class completed their first course, they taught what they had learned to a new class, at the same time beginning the second phase of their own program.

MCI-Walpole now has an H55 which the inmates installed themselves the night it was delivered, even though most of them had never seen a computer before, a Honeywell spokesman said.

MCI-Norfolk, a medium security institution, also participates in the program but has no on-site computer.

Aptitude tests are given at MCI-Framingham about four times a year and inmates scoring in the top half can begin the DP fundamentals course, according to Richard N. Henderson, manager of community service for Honeywell.

Students who successfully complete this course, as well as courses in flowcharting and Cobol, join the group of full-time, qualified programmers. These people take more advanced courses from the Honeywell instructors, teach and do the programming work for the state, municipalities and business.

Of the 150 inmates who have reached the teacher level, less than 3% have returned to prison after their parole, Henderson remarked, compared with the national average of 70%.

Success Credited to Autonomy

The inmates' autonomy is what has made the program successful, commented George P. Magrath Jr., the computer center's comanager.

CW Photos by P. Ward

Glenn Moniz beams as he works at the console of CSP's Honeywell H200. In his spare time, he simulates manned space flight on the computer.

He commended Honeywell for its "strict commitment to keep up the program as long as there is one person in the prison who shows interest."

One who certainly does is Glenn Moniz, who handles marketing and sales for CSP. Moniz has studied compiler building, operating systems and telecommunications.

An interest in manned space flight led Moniz to write 30 to 40 programs in Cobol, Fortran and JCL to simulate the journey of a Saturn 5 rocket launch carrying four astronauts to Mars and back.

The programs take into account propulsion, trajectory, fuel consumption, life support systems, docking in space, telecommunications, touchdown and other elements. The simulation allows Moniz to change factors to determine how they would affect the flight and to create problems to see how the astronauts could get out of them. He hopes to have Nasa evaluate the simulation some day.

Sense of Accomplishment

Magrath said most residents join the program for something to do that is interesting and gives a sense of accomplishment, rather than to prepare themselves for a high-paying job someday.

There is a group spirit among the inmate students and teachers, he said, that remains even after a person leaves the institution.

In fact, one frequent visitor is Bill Elwell, a former inmate and now one of seven programmers on Honeywell's staff who received their initial training here.

DP Course Cited as Top Job Skill Among Prison Training Programs

LEAVENWORTH, Kan. – Convicts still make shoes, brushes, furniture and clothing at the federal penitentiary here, but Leavenworth's walls also contain one of the larger contract programming groups in the Midwest.

About 30 trained convict programmers go to work each day on a five-year developmental programming contract with the U.S. Department of Agriculture that is worth more than $1.7 million.

"This is probably at the top in terms of skill" among the inmate training programs, many of which "just keep people busy," observed Glenn B. Carpenter. He mentioned that the program also seems to lead to a man's successful readjustment once he leaves Leavenworth.

Carpenter, assistant commissioner of Federal Prisons Industries, Inc. said records show at least 75% of the programmers who have left the Leavenworth Penitentiary are now working at DP-related jobs.

Inmates interested in programmer training must pass a stringent screening process before they begin a year's study with three fulltime civilian DP instructors. A year of apprentice programming on the Department of Agriculture project follows in which a civilian supervisor, two systems analysts and four project leaders work with the inmates.

The convict programmers earn about $30/mo after their first few months of training. Senior programmers make up to $100/mo.

Leavenworth has an NCR 200 which serves both as an in-house computer and as a remote job entry (RJE) device that sends the convicts' data to the Department of Agriculture's IBM 360/50 in Kansas City.

Unlike residents of state penitentiaries, convicts in federal prisons can only produce goods or services to supply other federal agencies.

The prison's $358,000 annual contract work for the Department of Agriculture is still only a fraction of Leavenworth's prison industry revenues. It is less than half that earned from making clothing, one-third that of furniture, one-tenth that of brush sales and just one-twentieth of shoe sales.

But "programming is a mental kind of work, a prestige sort of work," observed Al Stober, supervisor of the prison's DP workers.

One of the prisoners commented that some of the programmers put in "13 or 16 hours a day – programming in the offices and doing homework and solving problems back in our cells at night."

DATA ENTRY EQUIPMENT

is one of the things you'll be seeing at the 1975 Computer Caravan – the traveling computer users' Forum and Exposition. And here are some of the companies who will be exhibiting products or services in this field:

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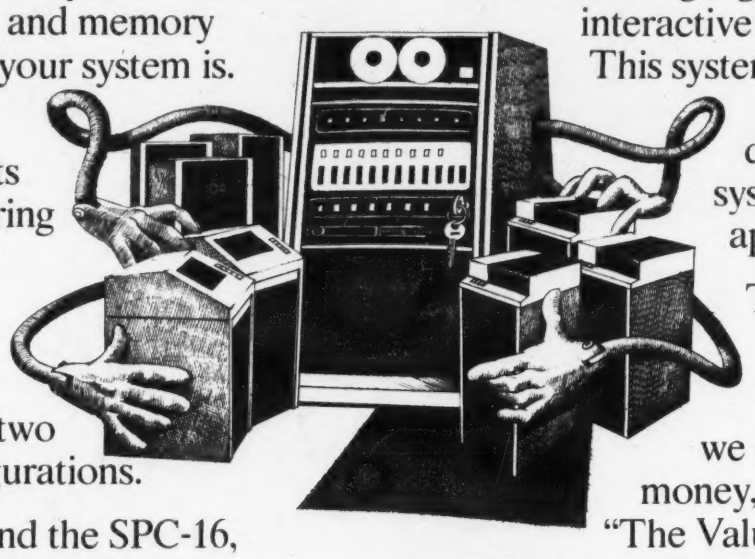

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POWERFUL MINICOMPUTERS BY GENERAL AUTOMATION

The terminal on the gym floor transmitted scores to a computer across the Penn State campus.

Meet's Terminal Scores Athletes' Feats

UNIVERSITY PARK, Pa. – The scoring system at a gymnastics meet has traditionally taken almost as much skill to master as the trampoline or parallel bars. But recently a computer was used to simplify the tabulation of scores.

The occasion was the 32nd Annual National Collegiate Athletic Association (NCAA) National Gymnastics Championships held at Pennsylvania State University, and the competition included 43 universities represented by more than 180 performers, requiring nearly 5,000 scores to be tabulated.

Previously, the meet required a small army of scorekeepers working all night to tabulate final results, and the scores still were not available until one or two days after the event.

Daniel L. Bernitt, research associate at Penn State's computer center, programmed an IBM 370/168 to take over the complicated chore this year. Scores were transmitted from the gym floor by a Tektronix 4013 terminal, and three smaller Datel 1030 terminals gave printouts of the results.

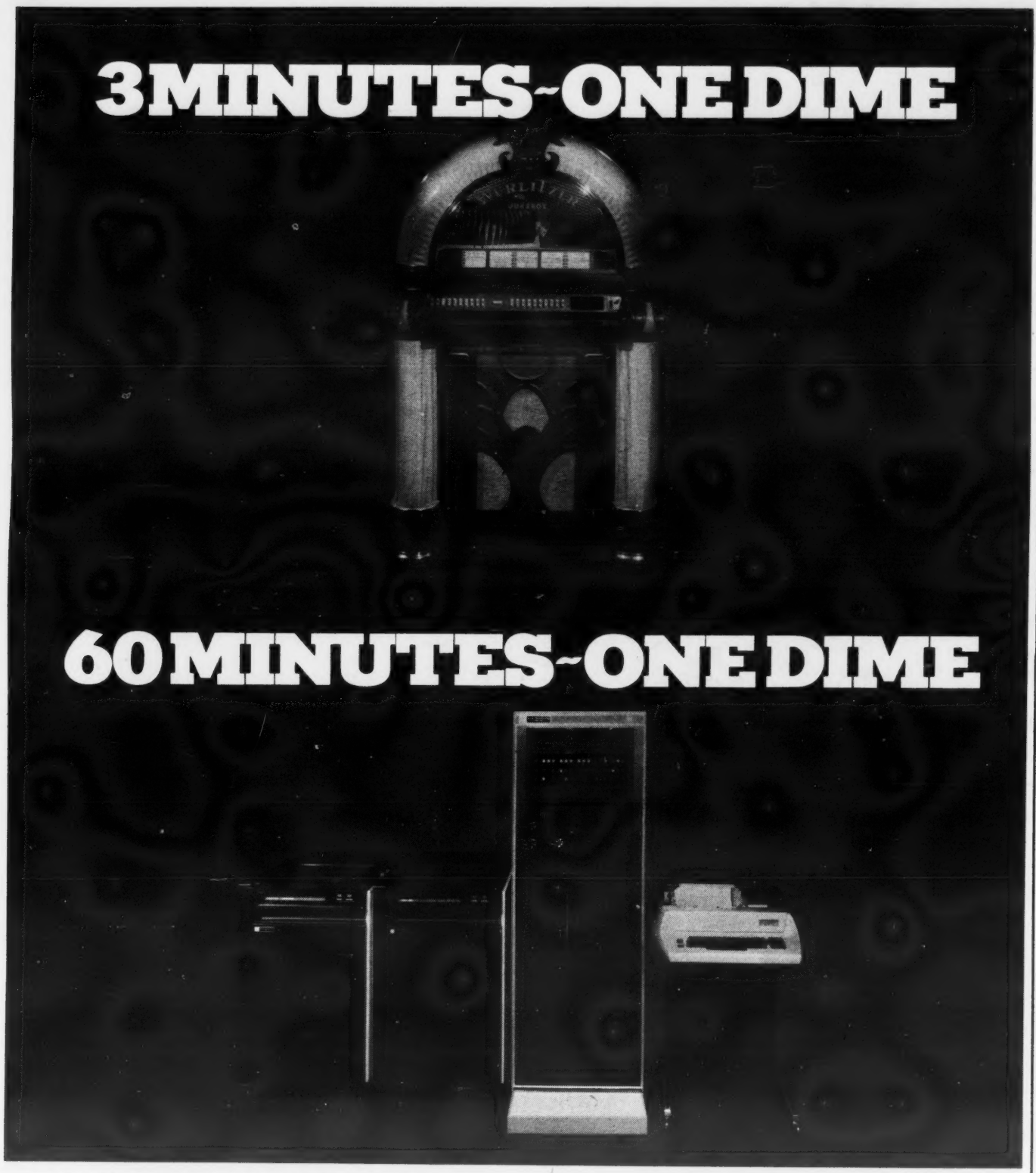
Scoring at a gymnastics meet involves a complicated system of rules and vagaries. Certain competitors are eligible only for team medals, some only for individual events and others just for an all-around medal. Star competitors are eligible for any combination of these.

With the terminals, anyone could access the system to find out team totals at any time or to determine what events a particular performer had competed in and how he stood in each.

Besides keeping score of competitors, the computer also kept an eye on the judges. In gymnastics, each of four judges provides a score following a performance. The high and low scores are eliminated and the other two averaged together to give the final score awarded.

The computer was programmed to see if any one judge was judging particularly high or low with any consistency.

The project was funded by the NCAA and it took about 200 manhours by three people to complete. Officials from Indiana State University already have contacted Bernitt to use his program at next year's NCAA championships, to be held there.



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Fire Protection Provided to GSA By Mini System

SEATTLE, Wash. – Tall, modern buildings can be deadly places when they're on fire, as several disasters around the world have shown.

The new 37-story General Services Administration (GSA) building in Seattle, however, has some unusual protection – a computer-based fire control system.

Based on a Honeywell 316 minicomputer and a backup unit, the $97,000 system monitors more than 1,000 checkpoints throughout the building, a GSA spokesman said.

When sensors "spot" a fire and trigger the building's automatic sprinkler system, the fire control system is designed to pinpoint the fire's location, summon firemen and police and notify hospitals.

The system, which also triggers prerecorded voice commands to guide occupants to safety, brings the building's 22 elevators to street level to make them available to firemen. There are recorded messages to tell elevator passengers what is happening as they suddenly descend to street level.

Other than helping to protect lives and property, the control system also helps to cut the building's fuel costs. Sensors outside the building relay temperature, humidity, wind speed and direction readings to the system, which controls the building's mechanical equipment.

The system also automatically turns lights on and off and dials air conditioning systems up and down while taking account of different schedules for Sundays and holidays, the GSA spokesman said.

Douglas Being Paroled

MONTREAL – Roosevelt Douglas, who was convicted for participating in the 1969 occupation of Sir George Williams University's computer center which caused $1.5 million damage [CW, Feb. 26, 1969], is being paroled after serving half of his 2-1/2 year sentence.

The violence at the computer center occurred after a two-week occupation by black students who claimed racial bias influenced the grading of examinations. It was ended when police and firemen rushed the center to extinguish a fire.

Douglas, one of 97 arrested, received one of the strictest sentences. He will be deported to Dominica, his native island in the Caribbean, after his parole.

For Recertification

Researcher Predicts DP Physician Performance Tests

SAN DIEGO – A computer may one day provide the testing instrument for analyzing the clinical behavior of medical personnel seeking recertification, physicians and osteopaths were told here recently.

Potentially a nationwide application of computer-assisted instruction, the Model for Evaluation and Recertification through Individualized Testing (Merit) offers physicians an alternative to pencil-and-paper recertification tests, according to Nancy Farr, research associate and coordinator of the project based in San Francisco.

"By encouraging doctors to take these certification tests, consisting of a computer-simulated patient interview and physical examination, we hope to improve the delivery of health care," Farr said.

Presently focusing on internal medicine, the model uses the Computer-Aided Simulation of Clinical Encounter (Case) method to evaluate the problem-solving ability of physicians. Developed at the University of Illinois Medical School, Case is "essentially an information retrieval system," she explained.

Physician Control

In general, the physician has control over the course of the interview and examination. Farr noted the goal of the project is to give the physician as much freedom as possible.

"An IBM 370/155 communicates with the physician in English and attempts no interpretation of his or her actions during the process, even if the doctor is on the wrong track," she commented. "A typist also inputs the doctor's questions via a CRT in an effort to minimize any inconvenience to the physician.

"Our only instructions to physicians are that they keep their questions concise and direct," she added. "We suggest that while they use their own vocabulary, they restrict their questions to one central concept defined by several modifiers."

For example, Farr explained, a patient comes to the physician's office complaining of severe stomach pains. By asking him whether he drinks and how much each day, the doctor begins to focus on the patient's problem.

The computer system picks up on the concept "alcohol" and the modifier "how much" in order to provide the physician being examined with an appropriate patient response, Farr said.

Similarly, questions asked during the physical exam are retrieved through a file system initially organized by particular parts of the body.

At the close of the interview and exam, the computer asks the physician to give a final diagnosis of all the patient's problems and to list the treatment required. Farr said the Case system is then capable of giving the physician some immediate feedback on how he or she handled the patient.

Eventually, Farr hopes the system will be able to actually score the physician's performance. Scoring is presently done by hand, and complete feedback on the correctness of the diagnosis, the appropriateness of the proposed treatment and the thoroughness and efficiency of the method is mailed out to the doctor.

Four New Cases

Working from the University of Illinois' library of 20 cases, the Merit team has developed four new cases relating specifically to internal medicine over the past six months, Farr remarked. These cases were generated by a process in which the physician, assuming the role of the patient, is interrogated by the computer, using an interactive branching program.

Put into interactive form, the case is then field-tested and refined by the programmer.

"We're never really through with the development of a case; modification continues as the case is used for testing," Farr said. "But the system's response to the physician must be appropriate 90% of the time before the case is actually used."

Individualizing Tests

She commented on the importance of individualizing the test to match the practice of the physician seeking recertification. In an effort to individualize exams, the Merit project has asked each of the 28 internists participating in the project to keep a diary of 100 consecutive cases, including information on the complaint and diagnosis and any additional pertinent sociological data.

This information is then summarized into a practice profile which is used to select the three cases in the library that are most applicable to the physician undergoing examination, Farr said.

"At present, we're trying to show statistically that the physician's behavior in the test situation is similar to his or her actual approach," she indicated.

"We plan to examine actual physician records to try to determine how closely the test situation simulates the office environment."

Represent Practices

A questionnaire administered to the physicians who have participated in the program thus far indicates that 83% felt their test performance was similar to their office behavior, she said. And 88% said the similated patients were representative of their actual practices.

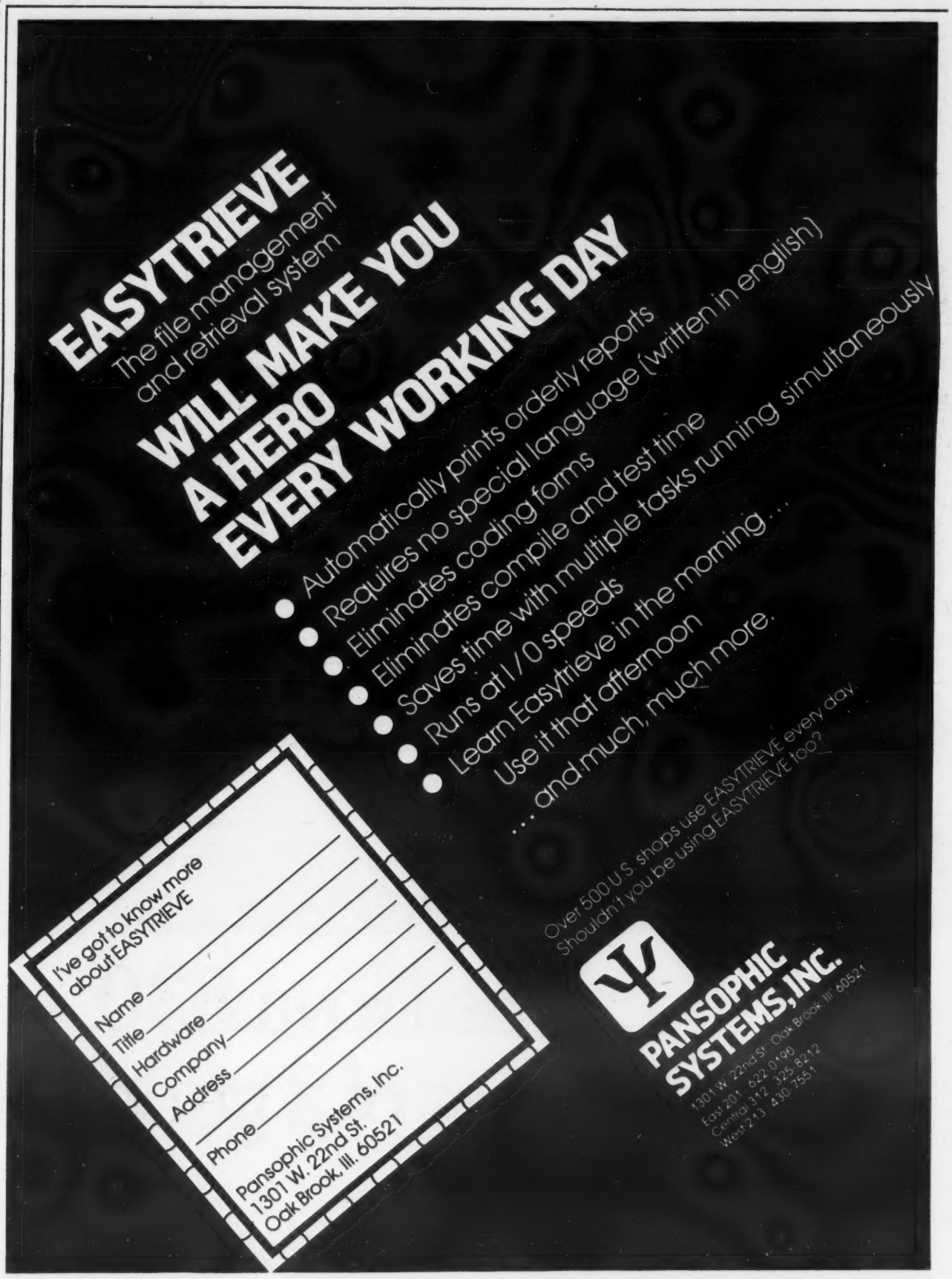
But "most encouraging of all," 93% rated computer simulation as "an appropriate and desirable mechanism for recertification testing," Farr noted.

'Impersonal But Accurate' Systems Will Play Doctor

PHILADELPHIA – Technology and an increasing population have progressed to the point where they have caught up with the family physician, according to Dr. George E. Ehrlich, professor of medicine at Temple University here.

Ehrlich recently predicted "shiny, impersonal but accurate computers" will eventually diagnose ills and prescribe cures for an increasing number of patients. The doctor's role will be to act on computer data, he said.

"While new systems of health care may militate against the development of the 'doctor-patient relationship,' they will offer more medical care to more people," he said.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Editorials

The Other Shoe

Now both pillars of the computer/communications business are under attack on antitrust grounds, and while the future is certainly cloudy at this point, users need to watch both actions carefully.

AT&T has joined IBM in the dock as a rejuvenated Justice Department seems more determined than ever before to press large antitrust cases.

Neither case, of course, is anywhere close to resolution, barring out-of-court settlements. The IBM case, slated to go to trial early next year, could take a year in court and the judge has indicated it might then take him up to a year to reach his decision.

The AT&T action is much further away, with Justice Department sources estimating three years before any trial could begin.

And, of course, after the initial trials of the cases there will likely be appeals that could drag on for years, with final decisions coming from the Supreme Court.

But even if the final resolution of the cases is not imminent, the possible outcomes need to be considered by computer users in their long-term contingency planning.

If the government is successful in either or both of the suits, users will face a far different world in the 1980s than the one they face today.

In fact, the possible changes can hardly be imagined — seven IBMs instead of the present one, two Western Electrics marketing a wide range of communications products, a separate long lines facility with increased competition for the communications dollar.

To many the possible changes will seem catastrophic; to others the changes could mean a wider selection of services and equipment with resulting lower prices and increased performance.

Of course, both AT&T and IBM may well be successful in their defenses, meaning little change in the business.

But if they are not successful, then only users who begin planning today will be able to effectively deal with the changed environment that would follow government victories.

The possibility of dismembering one or both of these two major forces is too real to be ignored no matter how repugnant the idea is to many users.

Users should not just bemoan the suits, but should begin thinking of contingency plans based on all the possible outcomes and they should make their views known to the Justice Department.

Documentation Dilemma

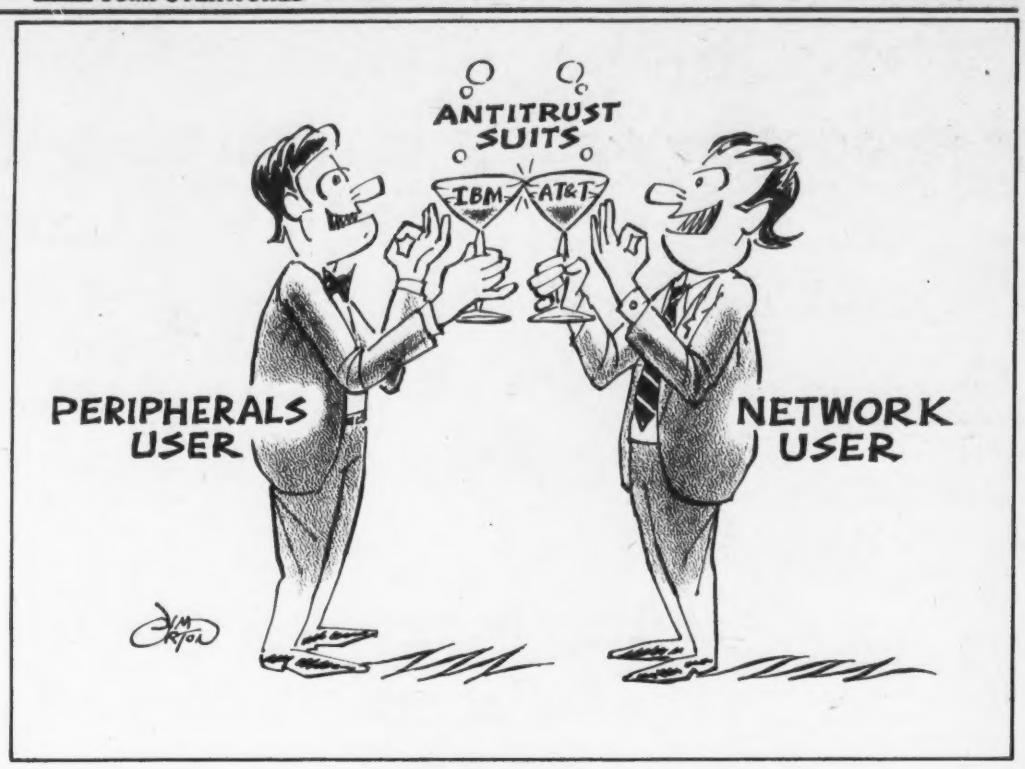
The recent reports that "millions of taxpayer dollars and years of programming effort are being wasted due to poorly documented computer programs within the Federal Government" [CW, Nov. 20] only show the tip of the iceberg.

If millions of dollars and years of effort are wasted through poor documentation in the government alone, the figure for business and the U.S. economy as a whole must be staggering.

Certainly organizations should implement standards for documentation and review procedures to make sure that good documentation is maintained as recommended by the report.

But, in addition, programmers and analysts have to realize that good documentation is a necessary part of every program or system and that neither can be considered complete without it.

The documentation effort should not be regarded as something management forces on programmers, but should be considered an integral part of the programming job itself.



'Cheers!'

Letters to the Editor

Advocate of Certification by Law Does Not Represent All DPers

Having failed to convince the majority of individuals involved in data processing that they should become holders of the certificate in Data Processing (DP), Kenniston Lord now decides to make the law his instrument to force everyone into his program [CW, Nov. 13]. He is trying to file a bill with "strict educational . . . provisions."

Goodbye up-through-the-ranks, so long minority groups who couldn't afford higher education, forget it women (who until recently were discriminated against in higher education programs of a technical nature); big brother is upon us.

I wonder how the magic evolves that makes a CDP holder all knowing in the interpretation of law and qualifies him to supplant the CPA in the area of accounting. Lord wants a superprofessional.

In representation to the states and Federal Government, I hope he holds himself out as spokesman for only his membership. He does not speak for most of us.

Al Smith

S. Bound Brook, N.J.

Male Chauvinist Person Replies

As a 100% bonafide all-American MCP (male chauvinist person), I:

1. Object to the oft-used term "motherhood and apple pie." Since we males are obviously superior in all categories (especially data processing), let us instead use "fatherhood and apple pie."
2. Object to the omission of explicit sex in most computer advertisements. For example, I found ECI Software Corp.'s Layla ad [CW, Aug. 21] cute but not provocative.
3. Object to Burroughs Corp. using MCP as the name for its operating systems.
4. Reject women's libbers' suggestions to change the terms: mailman to mailperson, manager to personager, manpower to personpower and mens room to person room.
5. Promise to never again write a letter to the editor on such a silly subject as women's lib.

Kent Huckstep

San Diego, Calif.

P.S. Excuse me now — I have to go beat my wife.

Layla Critics Too 'Moralistic'...

I have really never heard so much BS in my entire life. The BS of which I speak is the indignant response of a "so-called" moralistic segment of *Computerworld* readership to the Lyala ad.

Listen kids, sex has been around since the beginning of time-as-we-know-it, else we would not be here, n'est-ce pas?

In the past, people have tried to stamp out sex, alcohol and freedom and you know where it has gotten them? Into sexual neuroses and psychoses (resulting in warped lives), violence, murder and war.

When is this "moralistic minority" going to realize that in mammals there are two sexes, and they behave differently because they are made differently (those who will quote environmental influence need only to go to the country and watch the animals)?

If we continually limit our freedoms whether it be in the use of language, artistic tools or motion, we will reach the point of not being able to sense at all. We could not be happy because we would not know unhappiness. We would never have joy because we would not know the other extreme. We would truly be middle-of-the-road, know-nothing entities.

So here's to Layla. May she fulfill the dreams of both advertiser and advertisee. Let's put her to bed and let life continue on its wonderful bumpy way.

John Phipps

Franklin Park, Ill.

...Or Anxious to Get in Print?

I did not find the Layla ad offensive in any manner. Unfortunately, people with too much time on their hands often pursue destructive rather than constructive activities.

It would be interesting to know if the Layla letter writers criticize their own companies, TV stations and newspapers with such zeal or whether they really just wanted to get their names printed in *Computerworld.*

Ed Safford

Houston, Texas

Telephone Users Pay Anyway

I read right along with the first three paragraphs of the editorial, "A Gigantic Rip-Off!" [CW, Nov. 13], agreeing with what was stated. Then I got to the irresponsible statement in paragraph four. The idea of another FCC proceeding to cause Bell to pay a rebate to each and every subscriber is self-defeating!

Whatever profits Bell gained from the Data Access Arrangement have long since been used. Looking at the economics of Ma Bell, it ought to be obvious that any rebate to each and every user is paid for by each and every user.

Not only that, but the cost to the user has to be greater than the rebate because the costs of the new litigation and preparation costs for the rebate, etc., will get passed back to you know who.

Sure, some of it could come out of profits, but when Ma Bell's profits go down — rates go up!

R.R. Troxell

Sunnyvale, Calif.

(Other letters on Pages 14 and 16.)

Dear Computerworld:

I (borrowed) (stole) (shared) (copied) this issue of *Computerworld*, and it made me:

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- ☐ SKEPTICAL
- ☐ ANGRY
- ☐ PLEASED
- ☐ INVOLVED
- ☐ AWARE
- ☐ CURIOUS
- ☐ EXCITED
- ☐ DEMANDING
- ☐ FURIOUS
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UPC: Boon or Boondoggle? — Part 1

Proponents Hard-Pressed to Justify 10-Digit Code

By Bob Moneymaker
Special to Computerworld

Over the years, the retail food industry has been managed by individuals who have lifted themselves by their bootstraps to make it become the largest dollar volume business in the world.

Systems people, who have seen the old evolve into the new, would have to admit the supermarket is incredibly efficient – especially when they realize most of the methodology is the result of trial-and-error and "seat-of-the-pants" reactions to the intense competitive pressures required from serving the same customer as often as four times a week.

No other business does so much – for so little – so profitably. However, the amazing ingenuity of the supermarket operator is not obvious to the uninitiated and often is forgotten, even by himself.

When reviewing new ideas and newer applications of the same old principles, the myriad of variables that make up the business often tends to obscure the most pertinent question. The question that must be answered is not "How much can this new electronic marvel do for me and at what cost?" but "how much is the new system going to improve the present, proven methods and how much is that *incremental* improvement going to cost?"

Why UPC?

And when the full realization sinks in, we must then ask "Why a Universal Product Code (UCP)?"

Has anyone who is computer-conscious wondered about the validity of a 10-digit code number to identify grocery products when the largest supermarket has less than 25,000 grocery items? For years, the largest volume wholesaler in the nation, Certified Grocers of California, has needed no more than five digits to control its inventory of over 25,000 items.

"Yes," the proponents of the UPC would say, "but across the nation there are more than 500,000 various items and several thousand manufacturers. We need to identify both the product and the producer."

Again, we should ask why.

When a product is first purchased by the warehouse buyer or retailer, it gets an item code. All retail grocery items in all warehouses are so tagged within the inventory system. Why must the five-digit manufacturer code be on the product?

(The National Committee for the UPC decided each manufacturer would have five digits in the identification portion and five digits in the product name portion of the 10-digit number. If a manufacturer wants an identification code, he must subscribe to the fees promulgated by the group.)

The retailer and buyer know who makes the product when they first order it; the source is listed in the warehouse item file. Furthermore, a table look-up routine would eliminate the need for the UPC with its space-consuming 10-digits.

"Just a minute," the UPCers would say. "What about the electronic cash register (ECR)? It has to have a standard source marked code to make the automatic features effective."

That's a good point. Can we receive the automatic benefits of the ECR without the UPC? Most certainly! The electronic scale will work without linking in the price file. We can also scan a machine-readable code which is only the price.

Granted, we cannot collect all of the detailed information that the disk and drum sellers want to collect. But let's review the situation again.

Originally, the proponents of the UPC stated that the ECR system and the large investment it required could only be justified by reductions in operating costs, (i.e., labor) that would result from the elimination of price marking the items. (Then, no one contended that the savings from increased checkout productivity could cost-justify the ECR system.)

'Soft Savings'

A case in point was the now-defunct, point-of-sale pioneer, Inventory Management Systems (IMS), which saw the need to emphasize the "soft savings" from the increased information collected by inputting a code number for each item sold. This created all sorts of problems for IMS.

In 1971, at its Mayfair Test Store in Santa Monica, Calif. I visited the installation accompanied by John Robertson, now vice-president of Ralph's Grocery Co. We strolled through the market observing the costly price-coded labels affixed to the grocery items.

Reader Commentary

Unexpected 'Fetch'

When we purchased two items, the keyboard input of the velocity code on the price tag resulted in the "fetch" of a higher price than was marked on the tag. My companion graciously agreed to pay the higher price which showed on the "Nixie Tube" display. Most customers, including myself, would have insisted on paying the price marked on the item.

Here is a system design consideration that is vital. How does the system insure the price that is in the file is the same as that shown on the shelf tag? For years, the supermarkets have wrestled with this problem. Even case labels and unit price tags get "out of sync" with the items right behind the price molding.

Adverse Reaction

And how do we avoid compounding this problem with a file maintenance procedure that is economical?

Adverse customer reaction to unmarked items also seems to be making the original justification of the UPC rather tenuous, to say the least. Can you visualize a militant consumer, with a detail tape showing item description and price, clutched in his hand marching the manager back to the shelf to find a lower price on the shelf tag?

"Bosh," the UPCers would say. "The case labels and price-per-measure tags will smooth out and eliminate that problem."

That would be great – but what about the other comparisons the shopper makes using the item with its price marked on it? He checks it against corn in the can, frozen corn, fresh corn on the cob and so on. And what about the comparison made at home on the private label can of peas purchased last week at one store with the name brand peas bought this week at another?

"It's just a matter of conditioning," the UPCers reply. "The benefits from information that results from implementing the scanner will justify the expense."

The Crux

We now get down to the crux of the matter. Has anyone asked the UPC proponents who has a scanner that will read the symbol they picked? Is it the Big Domino? Will all fall in line? Is there anyone who has designed an ECR system so it cannot be justified without the UPC and its scanner?

Finally, will the present marketing environment in the food business receive information benefits to justify the costs? Can the supermarkets' systems departments devote the necessary resources to effectively assimilate the voluminous information that could result? Will the integration of this data into the distribution and merchandising systems require software investments? Who will be doing this design and programming?

Moneymaker, active in the California food industry for 14 years, is with Systems Consulting Services in Orange, Calif. Next week he will discuss a possible alternative to the UPC.

International Influence Mixed

Users Win One, Lose One in 1974 Standards Battle

Users have to look at the international influence on the computer community – currently much stronger than in the past – with a balanced viewpoint.

On the one hand, the influence of Japanese standards activity has provided a starting point for the new interface standards which are – at last – being prepared.

The Taylor Report
By
Alan Taylor, CDP

On the other hand, the "let's standardize standards" movement, which is attempting to coordinate the creation of international and American standards, can now be seen as a mechanism in which the wishes of American users can be effectively overridden by the mainframe vendors.

The victory for the interface standard came last month when the American technical team decided to go ahead with the production of an American standard on processor-to-peripheral interfaces, even if the few remaining differences between the Japanese and American versions of the standard could not be overcome.

As recently as this summer there were over 40 such differences, but the list is currently down to five or six.

This reduction of differences is even more dramatic when one considers that only a year ago the idea of any American standard on interfaces appeared to be dead and buried – killed by a claimed "lack of support" for the concept and by a misconstrued National Bureau of Standards report. The change is absolutely amazing, with the U.S. again taking an active and productive role in an effort where its absence has been noteworthy.

Seed of Activity

The seed of the new American activity in the interface area was the self-interest of the independent computer manufacturers, banded together in the Computer Industry Association (CIA). The leader of the effort, Norman Ream, proved to be both technically sensitive and capable.

The funding came from two areas – the CIA for the staff work and individual independent manufacturers for the technical critiques, redrafts, etc. Support for the effort came from some of the DP associations, government agencies, etc.

Altogether these were welded into a coherent and effective whole by Ream in the most dramatic computer standardization effort since the September 1959 agreement on how to successfully institute Cobol between Bob Bemer and Grace Hopper.

Even so, the success of the operation would not have been possible without the international effort, spearheaded in this case by the Japanese. They spent some years preparing a basic, detailed interface standard proposal.

Ream and his people had a solid start when they took up the battle. Even now, while there are still some differences between the two versions, they are sufficiently alike so that the difference will not be catastrophic to users or manufacturers.

The existence of the international operation therefore saved the American standard from being killed before it was born – and users can be thankful for this.

PL/I Standard Shows User Losses

By contrast, we should look at the actions of the international and American standards committees in the PL/I case. After an early abortive effort to push through an all-American PL/I standard, the decision was made to officially coordinate the work of the two active national committees through the international organization. The chairpersons of the technical committees were allowed to coordinate the two versions without reference to their committees.

Now problems are occurring because of the different composition of the two committees.

On the American side, the committee consisted of around 26 people, 60% of them users. Many 16-10 votes show this split, with the 10 mainframe vendors practically voting in a bloc.

The other committee, based in Europe, had only six members during most of the operation. Users have no representation, and all six votes are from hardware manufacturers.

The coordination machinery, although never formally stated, resulted in giving vendors the edge in any user-vendor confrontation. These confrontations would typically appear in the technical committees as 16 (users) to 10 (vendors) in the U.S., and six (vendors) to 0 (users) in Europe.

Put another way, the votes were apparently 16-16 with one committee split and the other committee solid. Certainly it looks reasonable from the voting record to side with the unanimous committee – particularly since these committees work on the fiction that the participants do not represent their employers but are neutral experts!

Effectively, however, it results in the vendors being able to outvote the users.

The solution here will have to be in the American area. If the international operation does not take steps to protect users, then the U.S. operation may have to do so. Whether it will has yet to be decided. Currently, however, the battle is going against the users.

Yet all is not black. The existence of more active user representation on the various standards committees is a positive sign.

So the war is by no means over. There is still time for users to win the vital battles of the future.

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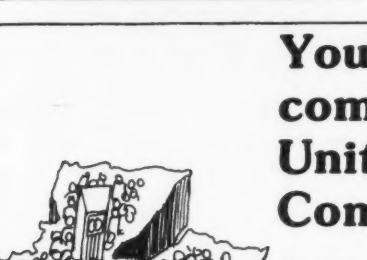

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Letters to the Editor

Preprocessors Still Practical When Author Restates His Case

In response to J.N. Lowrey's letter [CW, Oct. 25], which referred to the article, "Structured Programming Practical in Cobol Shops" [Oct. 2], McDonnell Douglas' success in using Cobol directly for structured programming is, I am certain, more a credit to the expertise of their programming staff than to the applicability of Cobol to structured programming requirements.

My saying unequivocally that "a preprocessor is a basic requirement" for Cobol installations using structured programming was, perhaps, an overstatement. In general, however, I still maintain that an attempt to follow *all* the structured programming rules (including no GO TOs) without a preprocessor will lead to less than the desired results for the typical Cobol installation.

It is clear that the success or failure of structured programming depends largely upon the programmers involved, regardless of whether a preprocessor is used, so allow me to restate my case: A preprocessor can significantly increase the effectiveness of a structured programming project for the majority of Cobol users.

Interestingly, the Oct. 30 issue of *Computerworld* announced a symposium on Cobol and structured programming which will address two topics: "Changes [which] should be made in . . . Cobol . . . to make it more amenable to structured programming techniques" and "How to write structured programs in the Cobol language as it exists today."

The implication is, of course, that Cobol is not well-suited for structured programming. On the one hand, the language itself needs modification; on the other hand, the Cobol programmer needs more assistance (which is precisely what a preprocessor offers).

Since Lowrey of McDonnell Douglas is cochairing the symposium, he must recognize the deficiencies in Cobol when it comes to doing structured programming (regardless of his company's success). Applied Data Research, Inc.'s preprocessor is currently being used successfully to diminish these deficiencies, and we'll be at the symposium to present our point of view based on our users' experiences.

Martin A. Goetz
Senior Vice-President
Applied Data Research, Inc.
Princeton, N.J.

What Are Material Advantages?

Al Curras' letter [CW, Oct. 9] almost struck to the heart of the problem.

An enormous number of "professions" have managed to provide some level of internal accreditation, self-policing and some sort of basic ethics. Some of these groups are long-standing (AMA, Bar Associations, etc.) while others are fairly recent.

If we suppose that professional and personal integrity is salable, as well as desirable, the reason for these groups becomes a little clearer.

Actually organizing a DP-oriented "association" would have many pitfalls, not the least of which is the need for a few reasonably competent, relatively selfless and persistent individuals who would organize our current mass of "splinter groups." Any association would have to have "teeth," represent integrity and objectivity, and show itself to be worthwhile for the average career data processing person.

I couldn't possibly presume to guess what form such a group might take, though something similar to Certifed Public Accountant, with overtones of the American Institute of Architects might be suitable. That brings up Stephen Kolarik [CW, Oct. 9] and his negative feelings about the CDP. Most of the problems he voices apply just as easily to CPAs. They have an advantage in legal standing that we do not yet enjoy, which probably defines the difference in status of an accountant and a programmer.

What's really needed is not just a few people with lots of altruistic motives, but rather a great many who can see the material advantages to everyone.

G.F. Davis
Milpitas, Calif.

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You'll be in good company at the United Kingdom Computer Caravan/75

A Caravan is known by the companies it keeps. Following is a list of the Caravan Exhibitors who have already reserved space in the 1975 United Kingdom Caravan Tour.

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Many fine companies have incorporated The United Kingdom Computer Caravan into their 1975 marketing plans. The reasons are simple. The market for EDP goods and services is fast growing in The United Kingdom (the English now use computers almost as extensively as we do in the U.S.), and the Computer Caravan's traveling Computer Users' Forum and Exposition is an efficient and economical way to meet large numbers of important computer buying influences throughout the country.

The U.K. Computer Caravan will travel to four major cities in the United Kingdom which are demographically highest in concentration of computer users. And 80% of U.K. installations will be within easy commuting distance of the show, making it practical for higher level computer users to come to the show in greater numbers.

In order to provide greater flexibility, we've included the option to exhibit at one, two, three or four cities with prices scheduled proportionately, each city including the full Caravarr package.

Dates and Sites

Following is a list of the cities we will be traveling to on the 1975 United Kingdom Computer Caravan Tour.

The Scottish Computer Conference and Exhibition
April 8-10, Excelsior Hotel, Glascow Airport, Glascow

The Midlands Computer Conference and Exhibition
April 15-17, The Leofric Hotel, City Centre, Coventry

The Northern Computer Conference and Exhibition
April 21-23, The Queens Hotel, City Centre, Leeds

The London and South East Computer Conference and Exhibition
April 28-30, Russell Hotel, London

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Letters to the Editor

Macro Option Undesirable For Documenting, Debugging

Richard Barth's suggestion that cross references should provide the option of excluding "all macro-generated symbols, whether referenced or not" [CW, Oct. 30] is especially *undesirable* due to the problems it would create in documentation and debugging. What will happen if a programmer modifies some field in a macro-generated area of coding?

The value of a "smart" (perhaps *selective* would have been a more elegant choice) cross-reference corresponds to the number of macro-instructions used and inversely to their quality.

From my experience I would say that the elimination of all unreferenced symbols from the cross-reference listing results in no problems. It would, in fact, be a help since you wouldn't have to flip past unused (hence useless) symbols. I assume that the source program is not a card deck and that temporary changes are made for testing before a final update is made.

While some readers may object to the optional elimination of unreferenced but defined symbols, no one has objected to the standard elimination of referenced but undefined locations.

I would recommend against first looking into the cross-reference listing to pick out a new symbol; it is usually wiser to first look into the coding before adding new subroutines. But if by chance you did pick a duplicate symbol and caused a program error, the result should cause you to smart.

Any cross-reference listing which does not flag those references that alter a program is inadequate to the needs of today's programming. Does anyone disagree with this?

R.A. Sobieraj
Perth Amboy, N.J.

How About a Separate List?

All of the responses elicited from readers by R.A. Sobieraj's call for a "smart cross-reference" list seem to have overlooked the ideal solution, one which would in all probability satisfy all users.

The solution would be not to exclude unreferenced symbols from the cross-reference list but rather to list them separately in a "list of unreferenced symbols." This second list could be made an optional feature, and the resulting assembly listing should satisfy the needs of both the debugging and the maintenance programmer.

The debugger is not burdened by the presence of unreferenced symbols, and the programmer altering existing code need not worry about duplicate symbols.

Charles L. DePrycker
Jacksonville, Fla.

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Random Notes

Independent Expands DOS On Interdata Minicomputers

WARMINSTER, Pa. – All the standard DOS features for Interdata's minicomputers are apparently included in an enhanced, two-partition version of the system now being marketed by Pinkerton Computer Consultants, Inc. The PCC/DOS package "allows for true multiprogramming," the vendor claimed.

The system extends standard DOS with high-speed disk-to-disk copying, real-time clocks, extended I/O drivers, additional logical units and register control and core dumping. PCC/DOS requires 4K to 18K bytes of memory and sells for $900 from 65 W. Street Road, 18974.

Parts Tooling Service Generates Punched Tape

SYOSSET, N.Y. – An Automatic Parts Tooling service that generates punched tapes to describe "even the most complex of shapes," the Algorex APT III program is based on Univac's APT-III and a large library of postprocessors for numerical control machine tools.

The Computer Services Division of Algorex Data Corp., at 6901 Jericho Tpke., has a Univac 1106, and a staff of programmers adds new postprocessors as needed and assists users in processing their work.

'Pats' Backs Natural Language Inquiries About Productivity

NEW ROCHELLE, N.Y. – Utilities, telephone companies, mass transit systems and construction firms are the expected users of the Productivity Analysis and Tracking System (Pats) software from Quantra Development Corp.

Pats monitors the performance of personnel and equipment in operating departments at any level, the vendor said.

Input to the $25,000 package can be from CRT terminals (under CICS or Btam), cards, key-to-tape or key-to-disk devices. Managers may use an English-like language to select and manipulate data.

Quantra is at 15 Whitfield Terrace, 10801.

New Yorkers Get 'Quick' Help

NEW YORK – Financial managers in this area can set up comparisons of disparate investment alternatives with the "Quick" financial planning service now available from Burroughs Corp.'s New York City Data Center.

The modeling tool is said to feature English language instructions and to allow calculations to be run either forward, to determine a rate of return, or backward, to compute values required to reach a given rate of return. The data center is at 80 Pine St., 10005.

Cut Personnel by 350

On-Line DBMS Saves Firm $500,000/Yr

By Don Leavitt
Of the CW Staff

MIAMI – Many companies have installed data base/data communications systems in the past few years, but few appear to be as satisfied with the results as Aristar, Inc.

Combining a little-used IBM teleprocessing monitor, a home-grown data base management system, a growing number of applications programs and an independent vendor's spooling package, the company has come up with a system that has chopped $500,000/yr off what it might otherwise pay for computing hardware.

The system has also provided Aristar with more and better financial controls, as well as the ability to handle more business faster and more accurately. And it is able to do it with 350 fewer people than before it went on-line, according to Joel D. Baumgarten, vice-president-information systems.

One of the largest consumer finance operations in the country, Aristar has developed over the past five years an on-line system (now based on an IBM 370/155-II), which handles 40,000 to 50,000 file update transactions a day from 450 regional offices, while concurrently running "normal headquarters chores" in batch mode.

The hardware cost savings estimates were based on the knowledge that several other consumer finance groups had gone on-line, but used dedicated computers with "some sort of modified airline reservation system" as the control software. They would need a second CPU in order to handle all the work Aristar runs on a single computer, Baumgarten said.

Development of the current system began in late 1969 or early 1970 with a joint Aristar-IBM effort to make IBM's Financial Terminal System (FTS) work as expected. IBM devoted a year and a half and seven to 10 people to that phase of the project, according to Baumgarten.

Aristar's DP staff created its own data base system and a library of batch and on-line programs that is still growing. The system, along with the Grasp spooler from Software Design, was installed on an IBM 360/50 under DOS and later, in April 1972, shifted to the 370/155.

With the addition of dynamic address translation hardware two months ago, the 155 was able to handle virtual storage operations and Aristar converted to DOS/VS.

The change to DOS/VS was dictated, Baumgarten explained, by the system facilities, IBM 3330 support and greater number of background jobs that could be handled with the VS environment. Many of the concepts were familiar to the programmers: "With our system, which can handle seven on-line tasks concurrently, we've been paging for years," he chuckled.

In addition to 512K bytes of main memory, the current configuration includes some 1,400K bytes of virtual storage. Thirty-four 2314-type disk drives from Memorex will be upgraded to 3330-type devices (also from Memorex) in six months. Seven tape drives, a pair of printers and an IBM 2703 communications controller complete the picture.

Linked to the central site by Western Union leased lines is a mix of terminals including roughly 70 IBM 2740-II units with various RPQs (special order features) and around 400 compatible terminals from Terminal Communications, Inc., Raleigh, N.C.

The application programs handling transactions as they move to and from the regional offices are written in Assembler. That way, the vice-president noted, they can be reentrant, they can utilize several "unusual" file structures required by the data base system and they are generally more efficient than if they were in some other languages.

The batch work programs are written in either Cobol or Assembler, Baumgarten added.

'Codalyzer' Detects RPG Errors For Disk-Based System/3 Users

HOUSTON – Disk-oriented IBM System/3 users should be able to find errors in their RPG-II programs with the documentation provided by the RPG-II Codalyzer package from Systems Design Products Co. (SDPC). Coding omissions, errors and redundancies can all be identified with the new analytical tool, the vendor said.

Unlike some previously available documentation programs, Codalyzer is "really organized around RPG," SDPC said. Like RPG, it is record-oriented, providing separate descriptions for each record type. It is also cycle-oriented, describing the operations upon each record in the sequence of the RPG processing logic.

Also like RPG, Codalyzer output is indicator-oriented, providing what the vendor said is "a depth of detail in indicator definition never before obtainable."

Each run includes three indexes, organized by names, indicators and statements, which ease error identification and location of the problem in the original RPG specifications. File descriptions and record layouts are also keyed to their program narrative descriptions, SDPC noted.

Booklet Format

Each set of documentation generated is arranged as a booklet, beginning with a title page and page-numbered table of contents. The pages are laid out in conventional 8-1/2-in. by 11 in. format.

Apparently recognizing that program development activities vary from installation to installation and sometimes from month to month within a single installation, the vendor has priced Codalyzer on an as-used basis at two cents per source statement analyzed, subject to a minimum monthly fee of $10.

SDPC is at P.O. Box 19067, 77024.

IMS Development Testing Eased

BURLINGTON, Mass. – OS/360-370 installations building applications under IBM's Information Management System (IMS) may be able to ease the testing phases of the development effort by utilizing the Pro/Test IMS Data Generator package from Synergetics Corp.

Working from the user's Data Base Definition (DBD) or from "simple parameterized input," the package generates "any IMS data base with any combination of segment formats." Any number of segments can be generated in up to 15 levels of hierarchy, the vendor said.

Segments and fields can be generated based on user-specified conditions and a segment may contain any number of fields in any data format – character, numeric, packed, binary or floating point.

Fields can be generated as constants, random values or ranges of values, or they can be based on arithmetic calculations involving fields or values otherwise specified.

In addition to creating a data base with which to exercise an IMS application program, the new package also produces reports documenting the testing process. These show, for example, the input actually used and the output generated by the program being tested.

The IMS Data Generator, which can be used by itself or in concert with other packages in the Pro/Test library, runs in about 60K bytes of storage and requires, in addition, the secondary storage space on which the generated data base is to reside.

The new Synergetics package is available from One Garfield Circle, 01803, for a one-time charge of $7,500.

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Monitor Displays, Updates Data On 38 Performance Indicators

MILWAUKEE, Wis. – Data on more than three dozen indicators of computer performance can be updated regularly, and shown on a CRT terminal linked to an IBM OS-Hasp configuration, with the Dynamic Display Monitor software from A.O. Smith Data Systems.

The displays are designed to aid scheduling, processing and reporting of the installation's workload. With instantaneous information on job status, priorities and resource availabilities, the vendor said, the user can make adjustments to accommodate rush jobs, to reduce downtime and to make the best use of the system's facilities.

Among the 38 readouts displayed are initiator numbers, OS job classes, priorities, core requested, jobs backlogged by class and priority, jobs on hold and those awaiting execution of printing or punching. In addition, present utilization of allocated spool space, number of tape and disk drives available for mounting and direct access disk space – cylinders and tracks – available for allocation are also shown.

The readings and their updated displays are made and refreshed on the CRT every five seconds. Although this sampling period can be varied, dropping it to one second would produce displays that change too rapidly to be useful, an A.O. Smith source reasoned.

By the same token, stretching the period to every 10 seconds would produce displays that tended to downplay the dynamic nature of the system being monitored, he added.

Although the package emphasizes "what is happening, rather than what has happened," a modification would allow it to generate summary records for overall planning purposes showing how the system has been utilized.

The monitor requires an IBM 3277 CRT or compatible terminal unit dedicated to the project and 100K bytes of storage in the system being monitored.

The Dynamic Display Monitor is available in object code for a one-time charge of $7,500 or $375/mo on a 12-month lease from 8651 N. Port Washington Road, 53217.

'Actress' Interfaces With Bank's DDA

TEWKSBURY, Mass. – Bank-based service bureaus may be able to earn extra income and save their payroll clients from stiff fines for late filing of tax payments, by using the PHI Payroll I package and the Actress accounting subsystem from Wang Computer Services, Inc.

Payroll I has been available for several years but Actress has just recently been acquired from Wells Fargo Bank. It interfaces directly with a bank's demand deposit accounting sytsem to deduct payroll amounts and service charges from the end-customer's account.

In addition to advising the bank's local branches that funds are due, before the end-customer's payroll is released, Actress collects and retains withholding data for federal, state and many local tax agencies, as well as Social Security deductions.

The system then prepares tax work sheets which are used to distribute the funds to the proper authorities. That, Wang said, is where Actress really helps the company being serviced by Payroll I.

Reporting periods and deadlines for transferring withheld funds have been made more and more stringent by the agencies, and fines may be 50% or more of the original amount due.

Actress calculates and prints an "advice of charges" and control reports for each of the users' service bureau end-customers.

The PHI Payroll I/Actress combination can be run on IBM 360s or 370s, under DOS or OS, and in VS environments. It requires "about 100K bytes of main storage."

The ANS Cobol source code for Payroll I is available for $20,000; Actress costs an additional $25,000. Maintenance after the first months of use is available for an extra charge, a Wang spokesman said from 836 North St., 01876.

Release 6 of 'Micos' Adds Trace Facility As Nova Debug Aid

ELMSFORD, N.Y. – Release 6 of Micos, the Data General Nova-oriented operating system from Minicomputer Systems, Inc., appears to include a number of new features and enhancements, ranging from added direct support for the programmer to improvements in the way the system works.

A trace facility under program control is an example of support for the programmer attempting to debug his programs at a terminal. Meanwhile, a multiple LET statement allows more than one program variable to be set in a single statement in the programmer's Extensive Basic coding.

The operation of the CHAIN program segmentation feature has been improved in speed by a factor of three to five times for most applications, the vendor claimed. Chaining allows individual segments to be small, increasing overall throughput in the system, a spokesman added.

Background Help

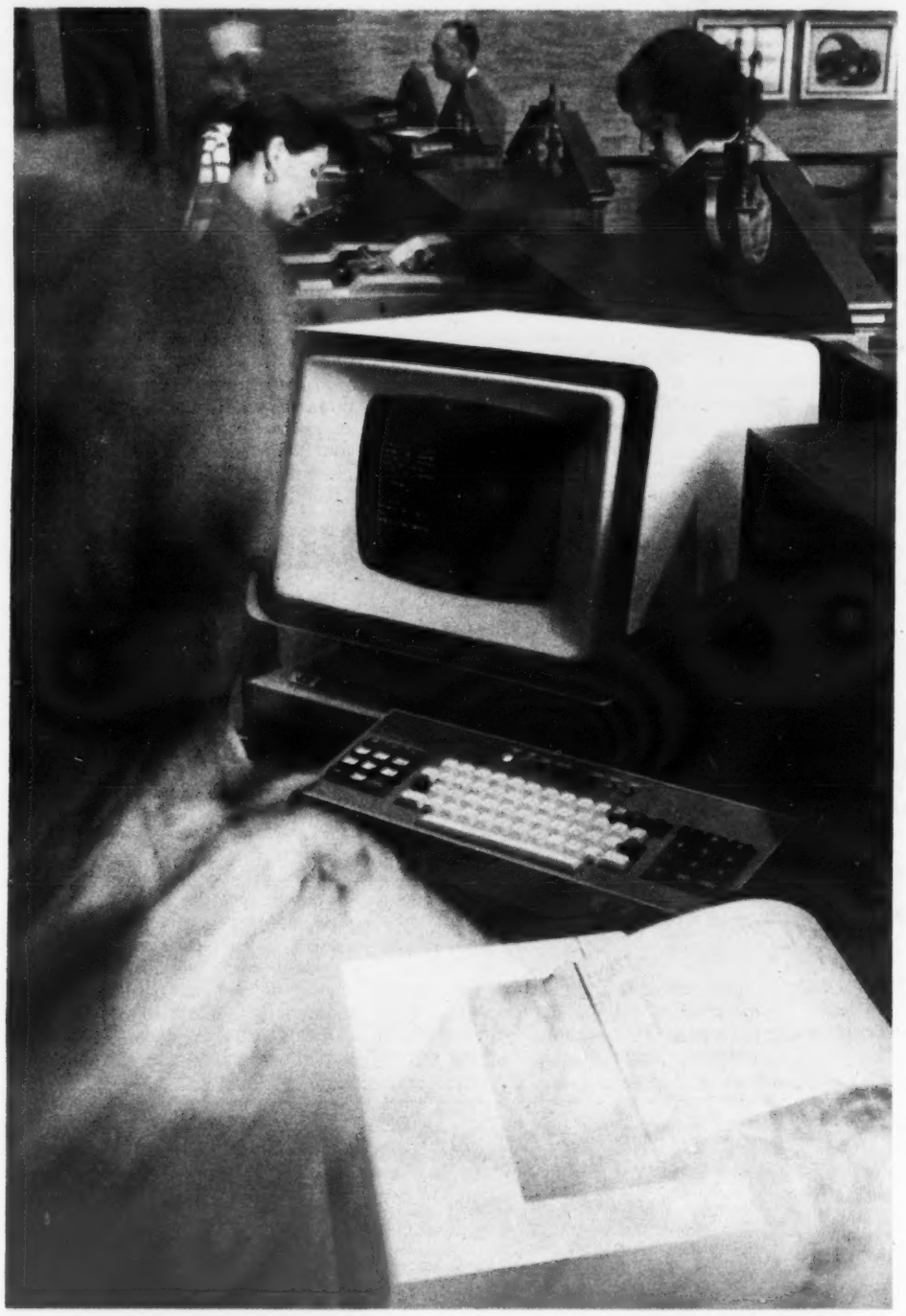
A "background" terminal facility allows jobs to be run without the need for a physical terminal device. Meanwhile, a TELL statement is said to provide interjob communication among certain terminals and to provide the control mechanism for background jobs.

A built-in CRT function generates common code sequences required by display terminals including, for example, clearing the screen and homing the cursor. In addition, a MAP system manager command shows activity at the system's terminals, including which accounts are using which terminals and which are idle.

The performance of the report writing programs has been enhanced by overlapping output to the line printer with the return to the calling program, and an edit mask for printing under format control is now available for blanking a field whose value is zero.

Micos can be installed on any Nova with at least 32K words of storage. The operating system is available for a fee of $8,000, with additional copies at $2,000. Level 6 is being distributed free to current Micos users.

Minicomputer Systems, Inc. is at 525 Executive Blvd., 10523.



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Simulators Analyze Performance Before Implementation

By Roger Buchanan
Special to Computerworld

There was a time when it was possible to stand in a computer room, watch each job run in turn, identify any bottlenecks and get a reasonable idea of the level of system utilization. Even without the use of any sophisticated measuring devices, it soon became apparent that the resources of computer systems were being very poorly utilized.

Concepts and Techniques

The introduction of multiprogramming operating systems was the first major step toward increasing system efficiency and, for the most part, was quite successful. But determining what the system was doing at any given time was no longer a matter of simple observation.

More innovations have followed and now we have a bewildering choice of telecommunication and data base systems, virtual memory, multiprocessing and independent vendors with new software and hardware. And in the midst of this complexity, the DP manager is forced to answer the question, "What system will best suit my current and future needs?"

The decision involves millions of dollars, and the unlimited possibilities for resource contention and interaction among processes preclude an answer based on observation and intuition alone.

Fortunately for the DP manager, there are now tools which will help gather the information necessary to make an informed decision. For the manager the best starting place is to understand what the current system is doing; hardware or software monitors can help in this respect.

With their aid, it is possible for the manager to identify problem areas and, based on past experience, suggest that certain modifications be made to the system. Unfortunately, monitors cannot predict the results of making proposed changes.

But simulators can. They have a predictive capability which permits the evaluation of a proposed system before a commitment to purchase or implement has been made.

Basically then, monitors look at the present and simulators look at the future; both are essential to the effective management of computer installations. However, this article will deal primarily with the unique capabilities of simulation systems.

Changes Over Time

In its simplest terms, a simulation model is a program which, during its execution, dynamically represents the modeled system and collects useful statistics on its performance. The modeled system could be a supermarket, a traffic network, the U.S. economy, another computer system or anything else whose state changes with time.

A simulation model of a computer system could be written in a general-purpose language such as Fortran, or a simulation language such as GPSS or Simscript. However, there are packages such as Scert, Case, CSS and System Analysis Machine (SAM) which were specifically designed for the simulation of computer systems.

Scert or Case (which have no language) could be used to write an analytical simulation model; CSS or SAM (which have their own simulation-oriented languages) could be used to write a discrete-event simulation model.

Analytical simulation packages make use of factor libraries to facilitate modeling. For example, for each piece of system software represented, there are distributions in a factor library for the overhead associated with carrying out certain functions.

These distributions are sampled as the simulation model is executed. The figures so obtained are placed in formulas which give performance statistics for the modeled system.

In addition, analytical simulation packages usually have the facility to carry out optimizing functions in such areas as job scheduling and block size determination. Because they use considerably less time on the host computer, the simulation of days rather than hours is feasible.

A discrete-event simulator, on the other hand, is one which executes a step in the model for each function performed in the system. For example, when an I/O transfer to a device is required, the simulator computes the start time, the time to position the medium (if appropriate), the transfer time for the specified number of characters and the projected time of "end of operation" interrupt. The last value is placed into a timing chain, and the next function in the system is simulated.

When the current simulated time equals the time of an event stored in the timing chain, then this event (i.e., the I/O termination interrupt) occurs. In the case of this example, simulated processing of the I/O termination interrupt would then take place.

In the modeling of complex systems involving telecommunications and multiprocessing, discrete-even simulation models give greater fidelity because they represent each instance of resource contention or interaction among processes individually; analytical simulators do not. Anyone concerned with performance evaluation needs to understand the impact of that difference.

If DP managers are faced with problems that simulation can solve, then why is the technique not more widely used? Admittedly, simulation has had some drawbacks. Model development used to take a lot of effort, improperly written models were often insensitive to changing parameters and some models took forever to run.

By now, however, most of the major drawbacks have been overcome. There are special-purpose simulation languages which provide the capability to accurately model complex systems. There are libraries containing models of commonly available hardware and software

(Continued on Page 21)

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Washington-Lee is one of several dozen financial institutions in Virginia, Maryland and North Carolina tied into the specialized computer network of Data Systems Corporation.

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Simulators Analyze System Performance Before Installation

(Continued from Page 19)

which reduce the modeling effort. And there are facilities for modeling a current application load from monitor data which reduce the effort still further.

These factors and many others are contributing to the growing acceptance of simulation as a computer system performance evaluation tool.

'SAM' in Detail

Naturally, I am most familiar with the product being marketed by Applied Data Research (my employer), but a detailed explanation of how SAM works may serve to show what is involved in computer simulation.

SAM is an example of a discrete-event language and system specifically designed for the simulation of computer systems. A SAM model of a computer system consists of a number of modules, or building blocks.

For example, modeled hardware is represented by a hardware module assembled by piecing together appropriate macros from a hardware library which contains predefined submodels of hardware components written in the SAM language.

In addition, a system software library is available which contains highly parameterized models of the most commonly used system software. Application jobs, message loads, files and media are also represented by specific SAM module types.

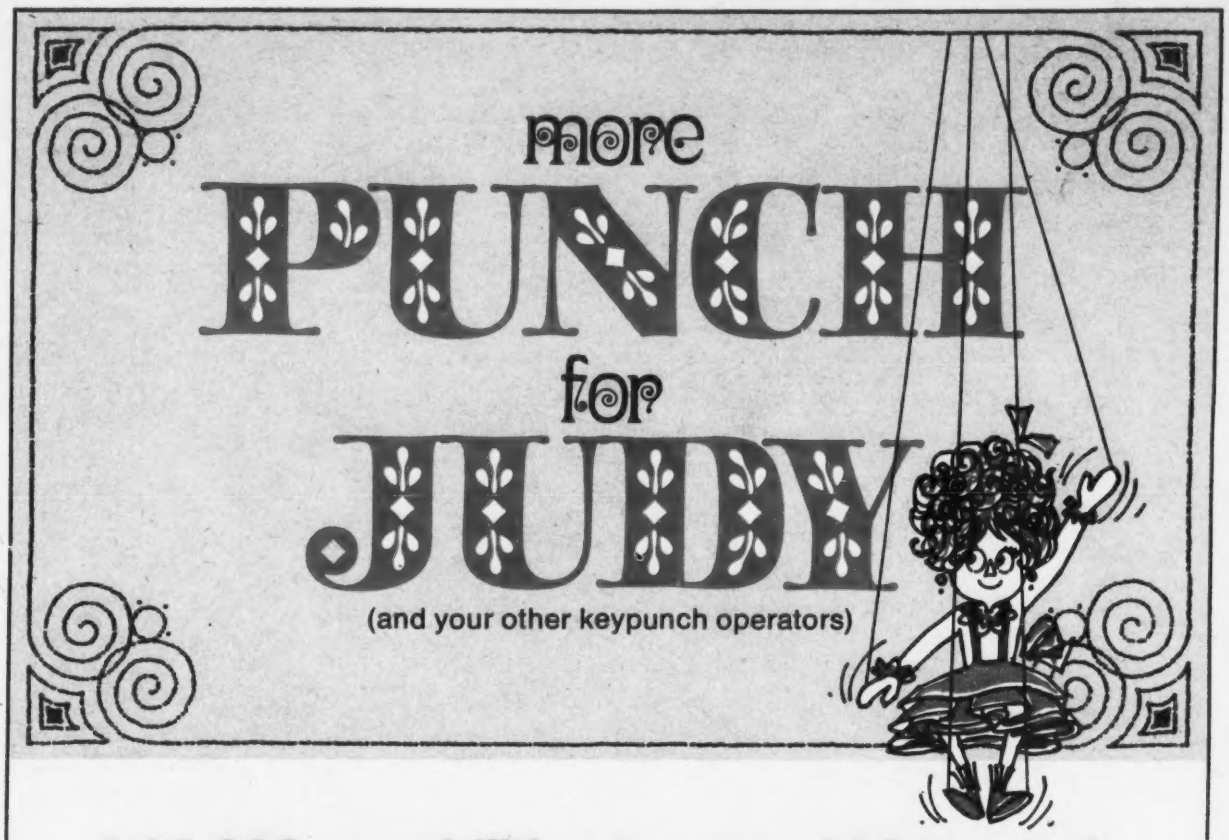
The virtue of this modular structure is that one module (a hardware module, for example) may be changed and link edited into the total model to investigate a different environment (a changed hardware configuration, in this case) in a matter of minutes.

With SAM it is possible to track the progress of messages through a telecommunications system. The times at which a message reaches certain critical points can be recorded and the lengths of queues may be output on a regular basis or whenever certain conditions arise, giving a means of identifying bottlenecks.

Another advantage is that a sophisticated user could write a "monitor program" in the SAM language which has no effect whatsoever on performance statistics, but which looks at certain parts of the modeled system on a regular basis and outputs selected information when specified conditions are satisfied.

Finally, SAM has an automatic model generation feature which generates accurate models of current application jobs by using SMF data to build a model of each job step. The resulting models can be augmented with models of proposed applications, allowing the DP manager to determine the impact of introducing new applications into the system while they are still in the design phase.

Buchanan is Applied Data Research product manager for SAM.



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CIRCULATION DEPARTMENT

British Airways Study Finds

AT&T Private Line Services Excelled by MCI Circuit

By a CW Staff Writer

NEW YORK – The most demanding data applications are those that must be available on an around-the-clock basis. Among these are airlines reservation systems.

In order to evaluate the reliability of private line service available between New York and Chicago, British Airways recently performed a technical evaluation of Microwave Communications, Inc. (MCI) and AT&T lines. The result showed that in most cases the MCI circuit exceeded the characteristics found on lines from the phone company.

Tests were performed on a full-duplex MCI line over a one-month period and compared with characteristics of similar facilities from AT&T. Transmissions were run at various speeds up to 9,600 bit/sec on both conditioned and nonconditioned lines.

Two modems, a Collins 216 and a Codex 9600C, were used in the tests, according to Seymour Mermelstein, data network supervisor at British Airways.

MCI knew that the tests were being done but AT&T had no notification, he explained. Asked why the phone company had not been told, Mermelstein said they probably would not have done anything special even if they had known of the test.

Data was successfully transmitted using the Collins modem at 2,400 bit/sec over a nonconditioned voice-grade line with bit error rates "better than one in 10^{-5}."

Data could not be transmitted at higher speeds with the Codex modem but, when C2 conditioning was added to the line, data was transmitted at 9,600 bit/sec for 30 minutes using the Codex modem without any errors, according to British Airways.

The circuit was later switched back to a basic voice-grade configuration without conditioning and it was possible to transmit at both 2,400 and 4,800 bit/sec.

During the test period, the MCI line went out once but the carrier restored service within two hours, Mermelstein said. "AT&T promises two-hour restoral time if the problem is in the central office, but if a man has to be sent out then it will be the next day," he said.

Even though the local loop portion of the circuits are provided by AT&T to MCI, the user said that MCI insists on a good local loop in its local facilities.

MCI Lines Less Costly

Although Mermelstein did not give exact cost comparisons, he said the MCI lines were "considerably lower in price" as well as being better technically.

"If you have an AT&T line, they will go right to the limit of their tariff specification," he explained. The phone company has only two parameters in its specifications – frequency response and envelope delay – and "everything else is goodwill," he said.

"In the old days, AT&T used to settle for 15 degrees as a guideline for phase jitter, but now because of the competition they will talk about 10 degrees," Mermelstein said.

It was especially significant that the Collins modem worked at 2,400 bit/sec on the MCI line because it is an older device that cannot tolerate much more than eight degrees phase jitter. He contrasted this with the more modern adaptive equalization included in the Codex data set.

Based on the tests, British Airways is planning to add MCI circuits to several portions of its reservation networks, he said.

Okla. Commission Puts Limits On SP Communications Approval

By Ronald A. Frank
Of the CW Staff

OKLAHOMA CITY, Okla. – The first intrastate authorization for a specialized common carrier was granted recently in Oklahoma with some severe limitations.

The Oklahoma Corporation Commission issued a certificate of public convenience to Southern Pacific (SP) Communications Co. with the provision that private line service be priced at the same rates as those available from Southwestern Bell Telephone Co.

The original application to provide private line service within the state was filed by United Video before it was acquired by SP Communications. The application had proposed a rate of $1/mo per mile compared with about $3/mo per mile being charged by Southwestern Bell for similar service.

In approving the authorization for the specialized carrier, the Oklahoma commission stipulated SP Communications had to charge the same rates as the Bell operating company. This decision apparently was based on stipulations in the state law which apply to a duplication of services being provided by common carriers.

Analysis

The state law says a new rate can be authorized only in cases where the existing carrier has in some way failed to meet the needs of the public. Apparently the Oklahoma commission insisted on identical rates because it felt SP Communications' service would be a duplication of the service already available from Bell and other existing carriers.

If the commission had determined the existing carriers were in some way not meeting the public needs, then it could have approved lower rates for SP Communications. But it determined that the existing carriers were providing adequate service and therefore it ordered the identical rates, according to a commission staff spokesman.

First of Its Kind

Since the Oklahoma intrastate authorization is believed to be the first of its kind, it is expected to set precedents in future state proceedings. Further, it may reduce the attraction of the specialized carriers to users.

It is doubtful that SP Communications will challenge the ruling; instead it will probably begin service at the prescribed rates. At some time in the future, it can propose lower rates if it can convince the Oklahoma commission that it will provide new types of services not available from Bell and other existing carriers.

Ironically, the higher rates will presumably give SP Communications a greater revenue than it needs to make its target profit margin.

It is not clear whether the higher rates are in the public interest, but apparently the ruling was not based on economic considerations.

Data Briefs

Voice Response System Runs Remotely or as Processor

WATERTOWN, Mass. – A telecommunications system with voice response capability, recently introduced by American Systems, Inc., is designed for applications where job specifications include inexpensive terminals, short numeric entries and operators having little experience with computers.

With the minicomputer-based Nucleus 4000, any Touch-Tone telephone can be used as a computer terminal, according to the vendor.

Potentially a telecommunications front-end processor, the device can also be used as a remote system that communicates with the main computer via high-speed telephone lines.

The standard Nucleus system services up to 64 simultaneous lines. Transmitting in half or full duplex, the device communicates with up to 10,000 words.

A typical unit interfaced to an IBM/360 or 370 starts at $50,000. The price rises depending on the number of lines added, according to the vendor.

The system is available in 120 days from the company at 123 Water Street, 02172.

Trendata 4000 On-Line Terminal Designed for Unskilled Operator

SUNNYVALE, Calif. – Trendata has released an interactive keyboard/printer terminal designed for on-line data entry, inquiry response and forms printing by unskilled operators.

The Model 4000 may also be used in terminal-to-terminal applications and as an off-line typewriter, according to the company. Coding structure is Ascii, with speeds up to 30 char./sec.

The upper- and lower-case keyboard on the device has tactile feedback and N-key rollover with two-key lockout. The company said communication control keys are clustered to minimize interference with typing.

A 10-key pad with a typical adding-machine format is provided for numeric data entry.

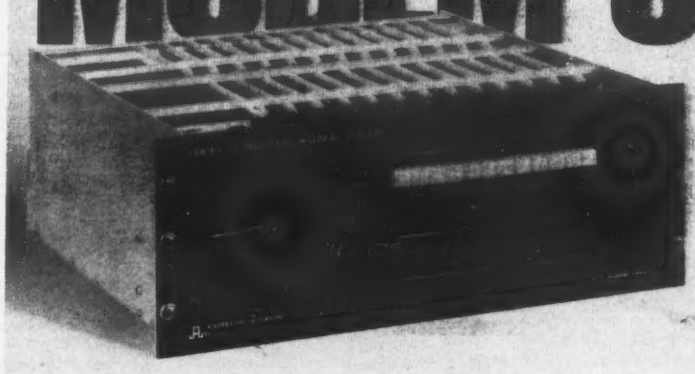
A daisy-wheel 30 char./sec printer with interchangeable type fonts and switchable 10/12 pitch is said to yield up to five copies, in addition to the original.

The company claimed forms printing on the Model 4000 is facilitated under local or remote forms control, using vertical horizontal and reverse tabs.

An optional "unattended operation" mode permits the unit to answer an incoming telephone call and receive data without operator intervention, according to Trendata.

The 4000 is presently available under one-, two- or three-year lease agreements. The monthly lease rate, including maintenance in locations serviced by the company, is $180 for the basic unit under the one-year plan from the company at 610 Palomar Ave., 94086.

MODEM SYSTEM



. . . with built-in test features to isolate any system failures

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Batch Processing From 40 Sites

Remote Terminals Boost Gulf Operation

PITTSBURGH, Pa. – Gulf Oil Corp. utilizes a communications terminal system to link its corporate headquarters here and its domestic operating headquarters in Houston with over 40 domestic and international locations, including sales offices, warehouses, manufacturing plants and order entry offices.

Messages transmitted by the network include financial data, sales orders, inventory listings and administrative traffic. Because of a growing volume of traffic, frequent retransmitting of messages due to errors and the expense of leased lines, Gulf recently decided to upgrade its communications system by installing Wiltek Model 400, 350 and 300 remote batch terminals.

Prior to installing the present equipment, Gulf used a 10 char./sec TTY network employing 11 private lines for both domestic and international circuits. All messages were prepared on paper tape and entered at random into automatic send-receive (ASR) units to await a poll from the central computer. No hard copies of messages were made at the time of preparation.

Traffic was routed via a computerized message switch, using a shared switching service. At the time of each poll, messages were transmitted one at a time; the volume of traffic was roughly 17 million characters per month and was growing rapidly.

Big Drawbacks

Gulf's management could see that their system had serious drawbacks: the cost of leased lines was prohibitive; manual preparation of paper tape was inefficient; transmission times were too slow; message retrieval was inadequate; and there was little capacity in the system for growth.

In seeking to upgrade its data communications system, Gulf wanted high-speed transmission over a dial-up network, elimination of paper tape, error checking for data reliability and the potential for handling a greater volume of traffic.

Gulf's network of 40 message locations now uses keyboard send-receive (KSR) terminals at almost all stations. Paper tape is still used at some locations and is interfaced to the terminals with ASR and ROTR units.

This varied equipment is needed to accommodate the different kinds of data transmitted over the network. There are some 12 different equipment configurations ranging from a single terminal to configurations utilizing four buffer stores and four I/O devices.

Dedicated System

The message switching computer, a Teleswitcher Model 510, is located at Gulf's Houston data center. The computer is totally dedicated to switching chores and is fully redundant, having two processors, two disk drives and two tape drives.

All messages have top priority, and heavy volume locations are polled by the computer every 15 minutes. Stations with lighter loads are polled every half hour. A TWX port also is available.

Because of Gulf's worldwide operations, the network must accommodate both 8-level Ascii and 5-level codes. The interface between 5-level transmissions over international lines and 8-level transmissions over the U.S. dial-up network is accomplished via code conversion techniques programmed into the central CPU.

Many terminals in the Gulf network have been modified so they receive in 8-level code but send in either 5-level or 8-level codes. A special input sequence at the beginning of a message alerts the central computer as to which code to expect.

Typically, the message switch will convert a 5-level message to 8-level code for internal processing and then route it to its destination or reconvert it to 5-level code if required by the destination equipment.

Polled Operation

The Wiltek remote batch terminals operate automatically. When polled by the message switching computer, they transmit data in a bisynchronous mode on a block-by-block basis at a speed of 1,200 bit/sec over voice-grade Wats lines. Each terminal has two endless-loop magnetic tape buffers, one to send traffic and one to receive traffic. And each has a 50K-character storage capacity.

Along with the two buffers, the terminals contain a communications control unit (CCU) and an internal modem.

Because flexibility is important in the Gulf network, most message locations have differing requirements – the number of I/O devices, the control interface and traffic-handling procedures. The CCU built into the terminals can interface up to eight auxiliary buffers. These buffers utilize not only the CCU but also the modem and Data Access Arrangement of the master terminals.

In high-volume message locations, Gulf operators can key in messages throughout the day without interruption, while the auxiliary I/O devices receive and type out incoming traffic automatically.

The remote batch terminals have provided Gulf with an effective written-wire communications system. According to Jack Platts, senior communications analyst in the Computation and Communication Services Department in Houston, Gulf now has a more efficient system at slightly lower cost and management is pleased with the results.

Among the major objectives, the new communications network has bisynchronous communications which drastically reduce the transmission error rate, high-speed transmission over voice-grade Wats lines, fast information turnaround and hard-copy printout of all messages sent or received, making information retrieval easier.

Operators at Gulf's Houston data center use Wiltek buffered, remote batch terminals to transmit messages over Gulf's written-wire data communications network.

Our program a language all

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Help Win Jobs

1,200 Bit/Sec Modems Speed Roof Truss Design Data

MIAMI – By using 1,200 bit/sec speed and ordinary phone lines, the Abcom Systems Division of Automated Building Components, Inc. (ABC) here holds down the costs of supplying a design service to fabricators of wooden roof trusses.

The principal product of the firm is a family of punched steel plates called GangNails, which connect together lumber members of trusses. They are sold through franchised roof truss manufacturers, and ABC offers the design service to help the franchisees win jobs for which they bid. The service is provided through terminals supplied by Western Union Data Services.

Autotruss Key

The key to the service is Autotruss, a program developed for Abcom by ABC's systems group. Autotruss turns basic span, spacing, loading and other data into a finished design complete with fabrication details, bid information and user costs. Typical truss manufacturers use Autotruss about three or four times a day.

Autotruss resides in a Control Data Corp. Cyber 72 computer in ABC's headquarters here. The system serves some 85 franchisees around the country through EDT 33 MSR (Model 33 TTY with magnetic tape) and EDT 300 (GE Terminet 300) communications terminals.

The center also services European franchisees through the GE time-sharing network. Data to and from Europe crosses the Atlantic via satellite and moves between General Electric and Abcom over the dial-up phone network.

Autotruss users pay the rental costs of the terminals and telephone line costs. The only Abcom charges are for computer connect time and a small variable charge related to what proportion of a complete package is ordered by the fabricator.

At 110 bit/sec, connect time is typically 15 minutes. With a tape cassette equipped terminal offering speeds up to 1,200 bit/sec, the connect time shrinks to about four minutes. The center is operated 13 hours a day, five days a week.

Higher Costs

Early users of the system operated at 110 bit/sec. Now Abcom's franchisees start with cassette-equipped terminals and the 1,200 bit/sec operation. The company believes that keyboarding directly to the computer center leads to input errors and overall higher costs.

Calls arriving at ABC's computer center at 1,200 bit/sec go to Bell 202C data sets and CDC 6671 multiplexers for input to the center's Cyber 72-14 processor. Calls at 110- and 300 bit/sec go to Bell 103B data sets and other 6671 controllers.

One Minute Turnaround

The computer has 16 ports and 65K 60-bit words of memory. Turnaround time for each job is about one minute.

A key part of the Autotruss system is brief customer files stored on disk subsystems. These files contain cost data, lumber inventory and overhead factors. They can only be accessed through identification numbers and passwords.

Abcom arranges for the phone connections, terminal procurement and training in both Autotruss and terminal operation. Once an installation is running, maintenance of the terminals is handled by the Data Services Termicare program. Termicare is a centralized diagnostic and maintenance control center.

MPTT-8 Transmits Paper Tape Input

BELTSVILLE, Md. – Mitron Systems has a paper tape transmitter which can be interfaced to a Bell 202 data set to transmit information on dial-up lines.

Called the MPTT-8, the device also connects to a Teletype Corp. 4210 magnetic cartridge terminal for paper tape input.

Data output is clocked at 1,200 or 1,050 bit/sec and the nominal read speed is 105 char./sec. Tape feeds from left to right and loading is done by lifting the right side of the tape hold-down lever and threading tape in from the left.

Four options are available including End of Tape and Tight Tape sensor; four automatic retransmission tries of a data block when the receiving terminal signals that incoming tape tailed; an inside unwind tape spooler; and a take-up spooler.

The MPTT-8 can be rented for $85/mo or purchased for $2,250. The options range from $8.50/mo to $15/mo or $240 to $350 purchase. The firm is at 5026 Herzel Place, 20705.

FDM Modules Contain Remote Diagnostics

WILTON, Conn. – A series of frequency division multiplex (FDM) channel modules developed by General Data-Comm Industries, Inc. is now offered for private line data and other users. The modules are available in a self-contained, stacked configuration with remote diagnostics.

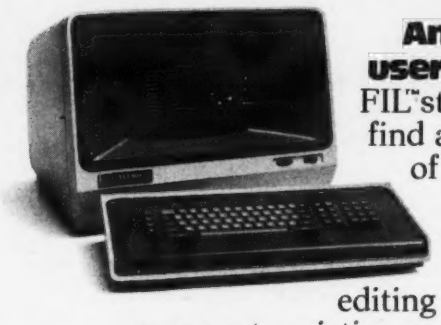
In the stand-alone, "six-pak" configuration, the GDC 1150 series of FDM channel modules can provide 25% more channels on one voice-grade line than can other FDM equipment, the company said.

Remotely-controlled diagnostics permit loopback of the transmit and receive circuits at the digital interface.

The company added it has attempted to optimize equipment reliability by furnishing power on a per channel basis.

FDM channel module prices begin at $344 with a delivery time of 30 to 60 days from the firm at 131 Danbury Road, 06897.

mable '3270' has its own.



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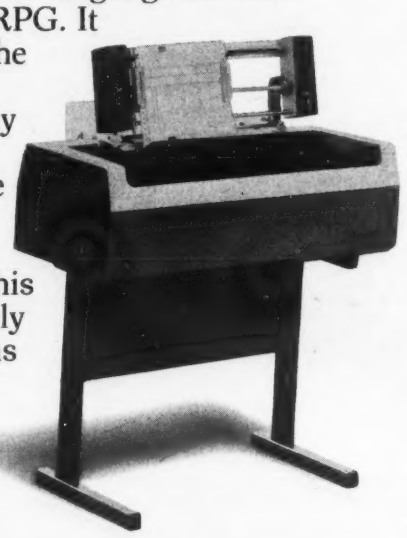
FIL is the fill-in-the-blanks language for field editing that's as easy to code as RPG. It augments existing screen formats—including the ones generated by CICS and IMS.



As a result, you can perform operations like capacity control, range checking, check digit verification, cursor control, arithmetics and many more. Before the data is sent to the CPU.

FIL stands for more productive operators. You don't need an interpreter to tell you the value of this new language. Catching errors instantaneously not only makes better use of operator time, but communications line time, too.

In fact, many companies find this increased line efficiency lets them install more terminals per line.

And, of course, you benefit by reducing CPU time wasted checking errors.

Our '3270' costs less. Not only is our Sycor 250 completely 3270 compatible, it costs less. And it's available with a wide range of peripherals—printers, a badge reader and light pen.

60 DAY DELIVERY

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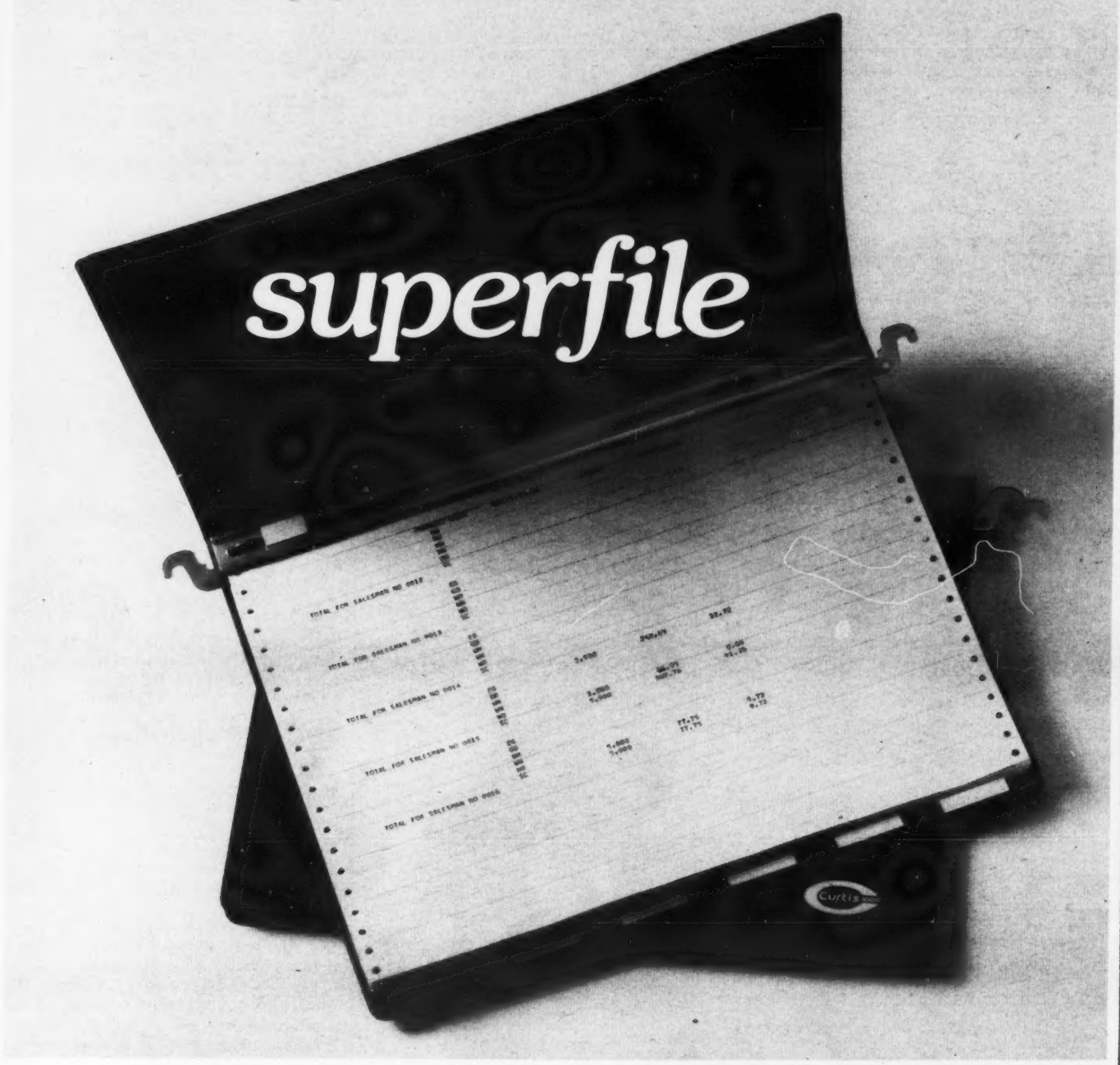

Terminal Plots Seismic Data

AUSTIN, Texas – Geophysicists in the field now have the ability to generate seismic section plots using production exploration data processed by a large central site CPU.

Unitech, Inc. has used its UT-1 remote job entry (RJE) terminal to link the field offices of a major oil company with the firm's Control Data Corp. (CDC) 6600. Equipped with a special seismic software package, Uniseis, the terminal accepts sequential trace data from the large system, reorders the data and prints seismic section plots in different formats using an electrostatic plotter at the remote location.

Savings

The seismic terminal represents savings for users, according to Unitech, since a substantial workload can now be performed by remote field equipment rather than by the more costly central site CPU. Unitech's terminal can operate around-the-clock in its seismic mode or as an RJE terminal when the plotting load slackens.

Plots

Total time to generate a plot depends on the amount of tape to be searched in acquiring an input file as well as the amount of data involved. The terminal generates plots as large as 20.48 in. by 97.4 in. including annotations. The analyst can select orientations either horizontally or vertically from left to right or right to left.

The Unitech terminal automatically inserts timing lines on the plot in 10 msec, 50 msec and 100 msec increments of increasing density. Two sizes of annotation characters are provided and the terminal automatically selects between the two on a space-available basis.

Mini-Based

A basic UT-1 seismic terminal consists of a 16K minicomputer, electrostatic plotter (with or without high-speed printer), disk memory, magnetic tape, arithmetic unit, console, card reader and communications interface.

According to Unitech, the UT-1 terminal with Uniseis software may also be applied to signal processing functions. The company maintains an extensive library of relocatable signal processing software modules. Unitech is at 1005 East St., Elmo Road, 78745.

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Bits & Pieces

T&T Unit Interfaces Keypunch to TTY

McFARLAND, Wis. – T&T Technology has interfaced a teletypewriter to an IBM 026/029 keypunch with T&T's 940 mechanical unit.

The 940 is basically a box that fits over the keypunch keyboard but is not permanently attached, so the keypunch can be used normally also.

Inside the 940 is a series of solenoid drivers, one for each character and control function.

The teletypewriter provides the signals to drive the 940 up to 15 char./sec.

The 940 is priced under $2,500 from the firm at 4820 Dale Road, 53558.

Decision Data Adds Printer To 96-Column Data Recorders

HORSHAM, Pa. – Decision Data's Model 1070 Data Reporter is now available as an optional printer for the company's free-standing 96-column data recorders.

Operating at a speed of 100 char/sec, the data reporter adds line printing and reporting capabilities to card data recorders, permitting them to print lists while cards are keypunched or verified.

In addition to this audit trail function, the unit can also be used to prepare formatted reports from punched cards, edit card-based reports automatically and prepare mailing labels from punched card files without the aid of a computer, according to the vendor.

The 1070 is available in two models, with 80 and 132 print positions. Rental including maintenance, ranges from $130/mo to $205/mo. Purchase prices start at $4,180 from the firm at 100 Witmer Road, 19044.

OCR Reader Incorporates Programmable Microcomputer

DEERFIELD, Ill. – The OCR 2001 optical character recognition system from SCM Kleinschmidt is a solid-state page and document reader utilizing photo diode arrays and a programmable microcomputer.

The 2001 reads OCR-A, OCR-B and marks up to 300 line/min. Standard features are selectable on-line and off-line correction, automatic feeder stacker, full alphanumeric keyboard, built-in CRT display and a software package including diagnostics.

Optional interfaces allow output directly to 7- or 9-track magnetic tape, paper tape punch or serial communications lines.

The unit is priced at $40,000 with a 7- or 9-track tape drive. A three-year lease costs $1,600/mo.

The firm is at Lake-Cook Road, 60015.

Two 370/155s Instead of 158 – Part 2

Firm Studies One CPU, Opts for Two

By Patrick Ward
Of the CW Staff

CHICAGO – There are "barriers" less tangible than hardware costs alone that can keep a company using two computers even after it has shown that it can cram its work onto one.

Last year, for example, Continental Assurance Co. (CAC) began a process of equipment utilization gains that led it from two IBM 370/155s to . . . two 370/155s a year later.

The company's single system study committee found that "if everything were operating beautifully, we could probably make it" on one 155, said Peter J. Jugle, the firm's manager of configuration planning and research.

But the study committee also felt that the single system's margin for error and flexibility could be so tight that the data center could risk becoming an obstacle to CAC's progress. Some of the additional barriers to a highly utilized single system as outlined in the committe's report were:

- "Emergency needs – The need for emergency machine service as a result of a missed schedule, a deadline or the expectation of missing a deadline.
- "Reruns – approximately 20% of production. Many causes, with all involved areas responsible.
- "Peak loads – Year-end and quarter-end peak periods seriously affect the ability to meet service standards. Reruns due to unfamiliarity with once-a-year jobs are commonplace.
- "On-line backup – With interactive systems becoming more and more important to the basic functioning of our company, lack of system backup becomes more and more intolerable.
- "Inefficient use of resources – Turnover of personnel brings forth new personnel, who bring forth new misunderstandings, lack of knowledge and ability and errors, all of which cut into our productive work.
- "The future direction of TSO is unclear – We are actively marketing TSO services to other companies held by our holding company, and yet a single system would preclude these services.
- "Inefficient testing utilities – We write in Cobol and everyone knows how efficeint that is. IBM wrote our operating system . . . Testing uses a major chunk of our time and could be improved.
- "The workload is in fact too great – We would be marginal on a single system. Midyear projections required a multiprogramming factor of 3.75, but current levels would require a multiprogramming factor of 6."

The single system team recommended the firm get rid of its rented 155 and that a "suitable" replacement be obtained as quickly as possible, since it suspected that there was an opportunity to find a lower cost replacement for the leased 155, Jugle noted.

Several alternatives were considered. Among them:

- 370/145 – Marginal, backup problems, cost about the same as 370/155.
- 360/xx – Too many programs with 370 code, backup and direct access problems.
- "Brand X" – Conversion cost too high.
- 370/158 – Too expensive, no immediate need for VS.
- 370/165-168 – (as a single system) – Too expensive, still a backup problem, overkill.
- 370/155 – Cheap as a result of current market, backup, familiar equipment, known capacity, basically only one Sysgen.

Jugle noted the company had slowly attempted to move all work to one 155 in anticipation of being without the other, and also as part of the single system study. As CAC came off a quarterly peak, it sent the rented 155 back to IBM. That left about two months to find, obtain and install a new 155.

CAC encountered problems running on a single system, "enough so that those who said we could not run on a single system had evidence" for their case, Jugle said. But the data center staff also showed that it could achieve very high utilization of the computer. On weekdays the CPU averaged about 94% utilization, he noted.

But hardware downs hurt a lot because it took so long to catch up again," Jugle explained. TSO and teleprocessing "fought for priority and both lost a lit-

At about this time, Jugle recalled, IBM got into the picture and told CAC's upper management how its DP operation was deviating from the true "migration path" – giving the impression "that we'd be out there all by [illegible]."

The executives decided that any decision must be justified on a two-year basis, Jugle said. "Using the best lease rates as a guide, we established depreciation rates equal to the lease rate and decided to buy as a result of analysis of cost of the 155 vs. 158 cost/performance vs. 158 anticipated market vs. 155 anticipated market vs. book value in two years. CAC eventually chose to purchase the second 155 from Econocom at a big savings over the leased machine, Jugle said.

In retrospect, Jugle allows that relying on the single computer would have saved hardware money. But "it might have been a constant battle to live within it."

Since the margin was so close, and the company felt some uncertainty, Jugle said CAC felt the best thing was to provide the backup.

"Obviously we have a lot of slack in there now," he said. "What is important is that we can get the utilization if we want it."

And, he concluded, "it's very hard to put a dollar value on backup."

CDC Prices 155 Speed-Up Unit

MINNEAPOLIS – Control Data Corp. "preannounced" its 370/155 semiconductor main memory during the 1973 NCC (National Computer Conference) and now, nearly 18 months later, the company has finally released prices and promised 30-day delivery.

The CDC 33159 Monolithic Main Memory, according to CDC, enables the 370/155 to operate at memory speeds approximately the same as the IBM 370/158. The 33159 can be attached to 370/155s equipped with or without the dynamic address translator (DAT) feature. The 155 was one of the two core memory CPUs IBM announced in its 370 line.

Read cycle is 1,150 nsec, write at 690 nsec and "partial write" at 920 nsec, a CDC spokesman said.

Five models of the unit are available with from 1M- to 4M-byte capacities.

Prices range from $242,862 for the 1M-byte model to $724,291 for the 4M-byte unit.

CDC claims IBM has certified that attachment of the 33159 will not affect IBM's maintenance of the mainframe. No software modification is required, CDC added.

Service, Lease Rates Up

MINNEAPOLIS – Control Data Corp. has announced selective price increases of 3% to 10% on the lease and maintenance charges for its large- and small-scale computers, terminals and peripheral products and software and related services.

Purchase prices generally are not affected and there is no increase for the firm's 3000 and Cyber 76 systems. However, 3% purchase and 10% lease price rises are slated for the Cyber 175s, the firm said.

The lease price increases are: Cyber 172, 173, 174 and System 17 computers – 7%; Cyber 72, 73 and 74 computers – 5%; certain card, printer, tape and disk peripherals – 3% to 7%; standard display, remote batch and communications terminals – 7%.

Maintenance on all systems and products has been raised 8%.

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Because all single disk cartridges conform to certain industry standards, you might think they're all equal. They aren't. The important difference is the extent to which a manufacturer is willing to go in order to *exceed* industry standards. It's a matter of making a disk cartridge better than you really need, because there could be times when you need it. Let's look at a few superior points of the BASF 130 System 3 disk cartridge:

The binder that won't quit

As you probably know, magnetic coating doesn't just stick to the aluminum disk all by itself. We use a special binding agent to produce an incredibly strong bond. The disk is sealed to prevent oxidation, so you can be sure the coating won't peel or flake off.

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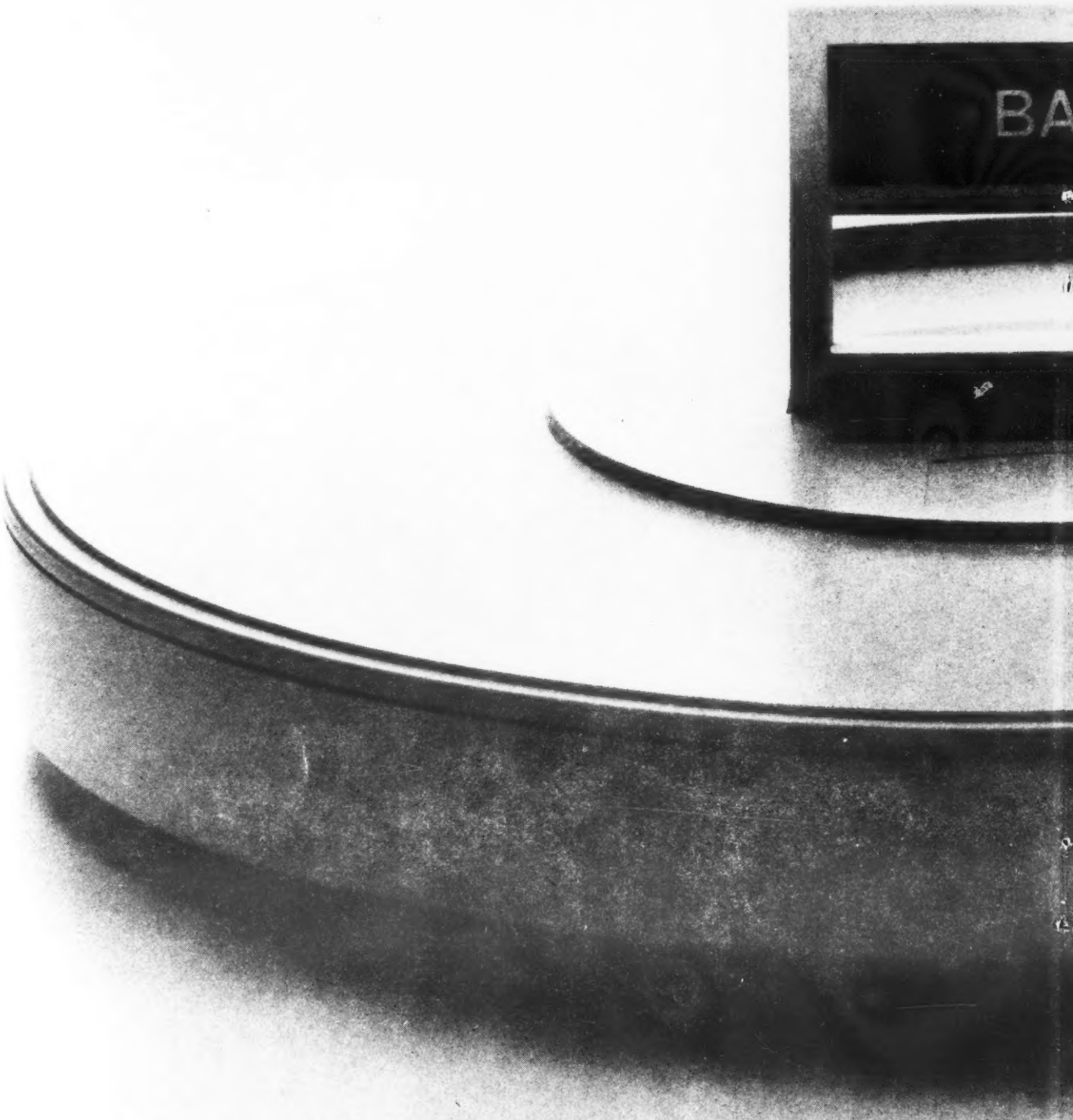
As the trend toward higher packing densities continues, it becomes increasingly important to monitor the thickness of coating deposited on the disk. The problem is compounded by the necessity for prog the outside toward the inside of the disk, b circumference decreases. For those reas methods in favor of an exclusive process

A polished performance

Following the coating operation, to achieve optimum surface regularity. W that the possibility of a head crash being c eliminated. We might mention that the coa coating and polishing techniques, are all i ness, which is the ability of the coated surf head loading.



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Our 130 costs no more than other System 3 disk cartridges. You're already paying for BASF quality. . . you might as well have it. For more information on the 130, or BASF's line of computer tape, disk packs and flexible disks, write to BASF Systems, Crosby Drive, Bedford Massachusetts 01730.

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Books & Brochures

104-Page Report Discusses Current Mini Technology

Minicomputers: A Review of Current Technology, Systems and Applications, by Dennis Hollingworth, National Technical Information Service (NTIS), Springfield, Va. 22161, Document No. AD-783 316/3WC, 104 pages, $4.50.

This report concentrates on minis costing from $4,000 to $20,000 for a processor with 4K words of memory.

Trends for the '80s Forecast

Computers in the 1980s – Trends in Hardware Technology, by Rein Turn, NTIS, Document No. AD-783 323/9WC, 20 pages, $3.

This paper presents a technologic forecast of computer hardware trends from 1975 to 1990. Projected are improvements in switching speed, power consumption and cost and physical size of bipolar and MOS logic circuits.

Based on these projections, the computing speed of processors for several computer architectures are forecast: uniprocessors, pipeline processors, array processors, associative array processors and, for command control, multiprocessors.

Early Predictions Summarized

Support of Air Force Automatic Data Processing Requirements Through the 1980s (SADPR-85). Volume III Technology, Appendix VI, including Annex A, by Robert W. O'Keefe, NTIS, Document No. AD-783 769/5WC, 312 pages, $7.25.

This document summarizes and integrates findings of previous technology forecasts that generally dealt with data processing and communications. It forms a base of planning for a DP system for implementation in the late 1970s and early 1980s by the Air Force.

City System Documented

Data Entry System Application Completion Report – a Wichita Falls, Texas, USAF Project, NTIS, Document No. PB-234 988/4WC, 465 pages, $9.25.

This report is from a series produced by the city covering activities from systems analysis through implementation and evaluation of urban information systems. The purpose of this particular report is to document the data entry system.

The system provides basic support to on-line applications in two ways. It simplifies the use of IBM's Customer Information Control System (CICS) for the application programmer. It also relieves the application programmer of the need for coding certain fundamental edit and data handling capabilities such as basic editing, paging and batch control of input data.

Sharing Studied

A Data Processing Feasibility Study of a Cooperative Computer Facility, by Robert Keston, NTIS, Document No. PB-233 062/9WC, 79 pages, $4.

This study examines: the extent of commonality of DP requirements of nine municipalities ranging in population from 7,000 to 68,000 to test feasibility of sharing equipment, software, and staff; the size and cost of a system to meet all needs; and the best and most cost-effective means for the nine jurisdictions individually or collectively to meet their needs for computing services.

Datel Cassette Reader Can Interface TTYs And Variety of Minis

CANTON, Mass. – The LPR-16 cassette tape reader/interface from Datel Systems, Inc. accepts tapes in the NRZI format and can drive a teletypewriter or interface to a variety of minicomputers.

The user can order either a full parallel minicomputer data bus interface compatible with Digital Equipment Corp.'s Unibus, the Data General Nova 800 and 1200 series and Hewlett-Packard 2100 minicomputers. A teletypewriter/RS-232C serial I/O interface is also available, or the user can order both interfaces.

The LPR-16 costs $2,095, with the computer interface, $2,495 with the TTY/RS-232C interface and $2,795 with both interfaces from the firm at 1020 Turnpike St., 02021.

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Four Forms Bursters Provide Range of Printout Processing

BARRINGTON, Ill. – Four forms bursters from Uarco, Inc. can provide high-speed or table-top manipulation of printouts.

Models 2080 and 2070 can process boxes of multiple ply forms up to 20 in. wide by 14 in. long at speeds up to 600 ft/min. With the addition of a drop-in Model 2300 imprinter unit the bursters automatically sign up to 100,000 checks an hour, the firm said.

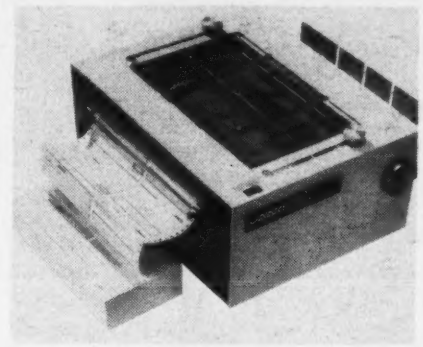
The new line has single-level infeed, controls and outfeed to lessen operator fatigue; a transparent safety cover; and inside safety handwheel for protection.

The 2080 burster has a powered stacking tray that automatically lowers as the forms load increases.

The 2060 has slower speeds of up to 325 ft/min. Each burster can be run on-line with a deleaver, imprinter, computer printer or microfilm copying device.

The 2060 is priced at $4,100; the 2070, $5,000; 2080, $5,500; and the 2010 is $900.

Uarco is at W. County Line Road, 60010.



Uarco Model 2010 Automatic Forms Burster

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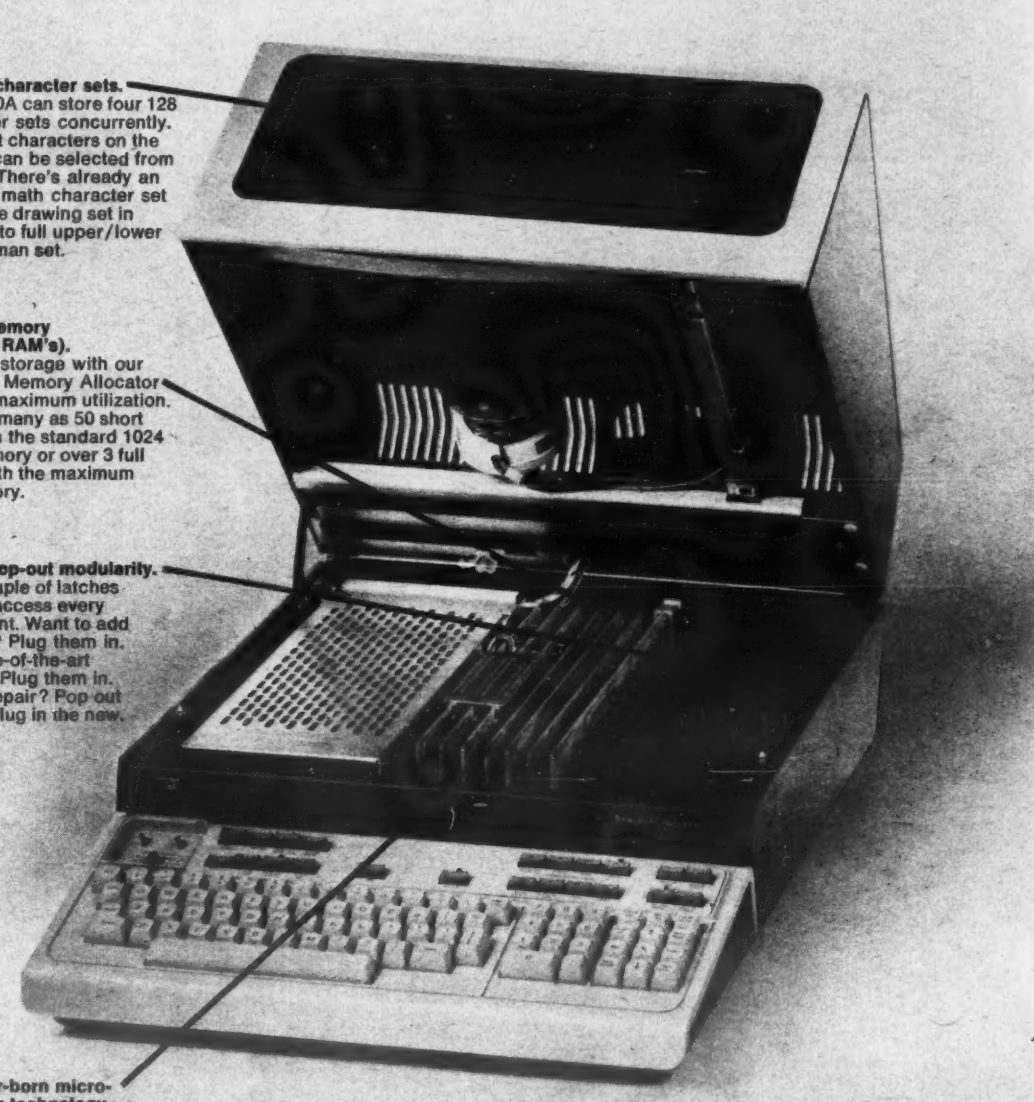

Plug-in character sets. The 2640A can store four 128 character sets concurrently. Adjacent characters on the display can be selected from any set. There's already an optional math character set and a line drawing set in addition to full upper/lower case Roman set.

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Computer-born microprocessor technology controls the show. An on-board microprocessor supervises memory allocation, data communication, keyboard scanning and display control.

TRW Turnkey System Evaluates Credit Ratings, Opens Accounts

HAWTHORNE, Calif. – A turnkey system to automatically evaluate credit ratings and open new accounts is available from TRW Data Systems.

The New Account Processing (NAP) system processes credit card application information using a point scoring method that evaluates each characteristic of the applicant to set credit limits or deny credit automatically, TRW said. The system also automatically produces letters of approval or denial and assigns new account numbers.

A display terminal incorporated in the system leads credit department employees through step-by-step procedures. NAP provides objective credit rating criteria and eliminates personal judgment and errors in assigning ratings, the firm claimed.

NAP also generates a magnetic tape containing information on newly opened accounts.

The system includes a mini processor, software programs, keyboard display terminal, disk storage and magnetic tape.

Prices are in the $50,000 to $100,000 range from the firm at 12911 Simms Ave., 90250.

Sykesdisk Linked to RT-11

ROCHESTER, N.Y. – Sykes Datatronics has added a software driver that interfaces the Sykesdisk flexible disk system with Digital Equipment Corp.'s RT-11 operating system.

As the system disk, the unit is said to support all programs available under RT-11 such as Basic, Fortran, Assemblers, editors and utility routines.

The driver is available at a cost of $100 along with the purchase of the firm's disk unit. Sykes is at 375 Orchard St., 14606.

Miniworld

Disk Replaces DEC Memory

GREENSBORO, N.C. – The Series M3000 disk memory system from Computer Labs offers hardware and software compatibility with Digital Equipment Corp. (DEC) PDP-11 minicomputers and can serve as a lower cost replacement for the DEC RK05 disk memory system, according to the vendor.

The system includes a moving head, rotating mass memory, controller and the cable necessary for connection to the DEC Unibus.

The embedded controller can access up to eight 2.5M byte platters. Models are available in single (removable) platter, dual (fixed and removable) platter and front and top loading systems, all having a 35 msec average positioning time for random moves.

A dual disk, 2.4M (16-bit) word M3000 costs $8,950 with deliveries beginning in January from the firm at 1109 S. Chapman St., 27403.

Cassette Compatible With Paper Tape

SUNNYVALE, Calif. – The Model 330 from Dicom Industries, a self-contained unit, is a plug-compatible tape cassette replacement for high-speed paper tape readers and punches.

Simultaneously emulating both paper tape punches and readers, the 330 increases the data storage capacity 10 times that of a 1,000-ft paper tape roll, according to the vendor. The standard Ansi/Ecma cassette is used.

Advantages of the 330 over paper tape systems, the vendor claimed, are increased reliability, greater operating convenience through front panel control, greater speed (up to 33 times faster synchronously and 8,333 times faster asynchronously) and higher packaging density.

The unit is priced from $2,195 from the company at 715 N. Pastoria Ave., 94086.

Tape Formatter Handles Up to Eight Qantex Drives

PLAINVIEW, N.Y. – Qantex has designed a tape formatter for its Model 600 tape drive.

The Model 86008 formatter consists of a single printed circuit card and will handle up to eight tape drives. It accepts 8-bit parallel bytes and converts them to the required phase-encoded serial format.

With the tape formatter, simplified tape commands are available to the system designer, Qantex said. Typical commands are Read Forward, Forward Space File, Write File Mark and Unload.

The formatter is said to provide the logic to read backwards and justify the bits in a byte.

The unit is priced at $570 from the firm at 200 Terminal Drive, 11803.

Plotter Makes CRT Displays

FRAMINGHAM, Mass. – The DT212 point plotter from Data Translation, Inc. is a standardized module that allows minicomputers and microprocessors to generate digital information onto X/Y CRT displays and other X/Y devices.

The module can drive devices up to 50 feet away through coaxial cables, according to the firm.

The DT212 is compatible with most minicomputer and microprocessor I/O buses, a Data Translation spokesman said.

The device costs $345 from the firm at 109 Concord St., 01701.

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Inspect its features. At $2640* you won't find another terminal that comes close. Inside or out. HP's 2640A. The terminal that grows with your system. It's from Hewlett-Packard. Come and get them.

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Removable Disk Packs Rate Best In Datapro Survey on DP Media

DELRAN, N.J. – Removable disk packs rated highest in customer satisfaction among several types of DP media and supplies that users evaluated for a recent Datapro Research Corp. survey.

The research organization obtained 339 user responses in its survey of disk pack users. The responses put IBM highest in satisfaction among the major disk pack brands with a 3.7 rating; Caelus, Control Data, Memorex and 3M tied with a 3.6 rating. The weighted average for the group came to 3.7.

The 323 responses from users of 1/2-in. magnetic tape put Graham Magnetics highest among the widely used brands in the survey. Graham's rating was 3.7, while IBM, Memorex and 3M all shared the product group's average of 3.5.

The 274 user responses on suppliers of forms for printers centered around availability. This problem, along with price rises, has hit users with a one-two punch for over a year.

Moore Business Forms, Duplex and the Standard Register Co. led the major supplier list with a 3.5 rating in customer satisfaction, compared with 3.3 for the product group as a whole.

IBM headed the satisfaction list among large suppliers of printer ribbons. Based on 248 user responses, IBM emerged with a 3.6 rating compared to the 3.3 product average.

In the area of punch cards, IBM and the Globe Ticket Co. led the list. Each had a 3.6 rating based on responses from 262 users; the product group as a whole had a 3.4 rating.

In all of these ratings users often put small suppliers over the giants but noted their products are not always available across the country.

Deterioration Problems

The Datapro study noted even the highest quality tape deteriorates over time.

The user can make use of statistics available from his operating system to determine the number of retries encountered on each tape, but the study suggested a less complex method would be to inspect the tape reels to determine the conditions of the edges. This gives the user an idea of the mechanical stress the tape has undergone.

Once a tape nears the low end of acceptable performance, the user can either throw it out or clean it, Datapro said.

The survey is part of "All About EDP Media and Supplies" and costs $10 per copy from Datapro at 1805 Underwood Blvd., 08075.

Courses Teach 370 Maintenance

AMBLER, Pa. – TLNT, Inc. has introduced several maintenance courses for the IBM 370 CPU.

Specifically designed to provide CPU maintenance training on the 370/135, 145 and 155, the courses cover the CPU, its data flow, functional units, microprogramming and overall maintenance theory. The programs are said to provide a maintenance engineer with the ability to completely maintain the CPU.

Channel Operations

The introductory courses, said to be particularly useful to peripheral manufacturers, provide a means of acquainting personnel with the use of the console and diagnostics, the firm said. The courses teach the basic channel and storage operations and are designed to enable a peripheral customer engineer to function intelligently with the CPU.

TLNT charges about $600/week for a course at its site or $40/hr to have an instructor at a customer site. The introductory course takes eight days; the complete course 18 days.

The company is at Suite 304, Axewood, Skippack & Butler Pikes, 19002.

Scale Models Help Layout

INDIANOLA, Pa. – Scale models of DP equipment, furniture, people, walls and flooring from Visual Industrial Products can simplify layout and planning of the DP site, according to the firm.

The firm's 900 scale models are available in system kits or as individual models of a variety of manufacturers' products.

An IBM 360 system kit with 35 scale models, for example, costs $69 from the firm's A.D.S. marketing subsidiary at Box E, 15051.

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Toy Maker Thinks DP Good Investment

EAST AURORA, N.Y. – Fisher-Price, manufacturer of pre-school toys, has grown rapidly since it became a division of The Quaker Oats Co. in 1969.

To keep pace with its fast growth, Fisher-Price has invested heavily in data processing to tie in all elements of the company's operations.

DP teams were established to develop systems to serve the marketing, sales, manufacturing, financial and accounting departments working from a common data base.

The team approach, according to Daniel J. Schmauss, director of information systems, has resulted in "good user involvement" with the DP staff and departmental users cooperatively working toward problem solutions on an integrated basis.

The latest equipment acquisition is a Univac 1106 system with a main memory storage capacity of 256K words, eight 8414 magnetic disk units with a capacity of 240M bytes, six magnetic tape drives, 10 Uniscope 100 CRT terminals, a smaller Univac 9200 computer, card reader, high-speed printer and a card punch.

Additional disk units, consisting of six Univac 8440 subsystems, are currently on order which will bring the total storage capacity to 772M bytes, a 300% increase in the present capacity. Moreover, the new disk units will have an access speed twice as fast (30 msec) as the present 8414s. Also on order is a new high-speed printer.

The disk units contain all of the information in the data base with the magnetic tape units used for storing historical data not required to be on-line.

Fisher-Price also uses Univac's Data Management System (DMS) 1100, which allows a large integrated data base to be stored in random-access mass memory.

A Different Drummer

In contrast to many companies which place priority in implementing accounting applications on their system, Fisher-Price chose a different course.

"Our major requirements were to bring the benefits of data processing into action as soon as possible to assist our order entry and manufacturing operations, and we made our plans accordingly," Schmauss asserted.

One of the key applications for the 1106 system is in handling orders. When fully implemented, the processing of orders will be completed in one day compared with the present two days or three to four days if the orders are incorrect and must be checked by customer service.

On receipt here in East Aurora, the orders are edited, then keypunched or keytaped for entry into the system on a daily batch processing basis.

Automated credit checks are made for all orders. Files in the data base are set up with specific parameters which automatically flag customers whose credit ratings have slipped.

In the near future, the orders will be entered directly into the system on a real-time basis, as they are received, through the use of the CRT terminals.

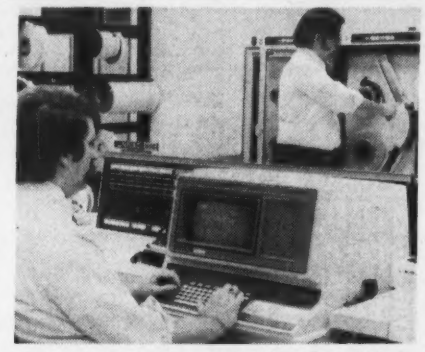
After processing in the computer, the orders are printed out on a high-speed printer on a three-part form perforated into two sections. The right side of the form is used as an order acknowledgement. One copy goes to the salesman, another to the customer and the third is for office files.

The left side of the form is for the traffic department; one copy constitutes the shipping order, the second copy forms the packing slip going with the goods to the customer and the third is an office copy.

CRT terminals are used for checking order status. While a customer or sales representative is on the telephone, a terminal operator can answer queries and provide details of the status of a particular order from the data base. With the same technique, the traffic department can find out to which distribution center any order has been sent for shipment to the customer.

At the time the goods are shipped, the system produces the invoice, simultaneously back ordering any item not shipped and sets up an entry in the accounts receivable file.

A second major use of the 1106 system is in the manufacturing area. The status of raw materials on hand is reported on a 24-hour basis and the report on shipments of finished goods is updated daily.



One of the key applications for Fisher-Price's Univac system is handling orders.

Other reports deal with damaged and returned goods. Reports are prepared semimonthly on unfilled orders and all orders about to reach the time for shipment.

Smaller Univac 9200 computers installed in other plants are used as terminals for remote job entry, feeding data to the 1106 system here and, in return, receiving processed information from the central processor.

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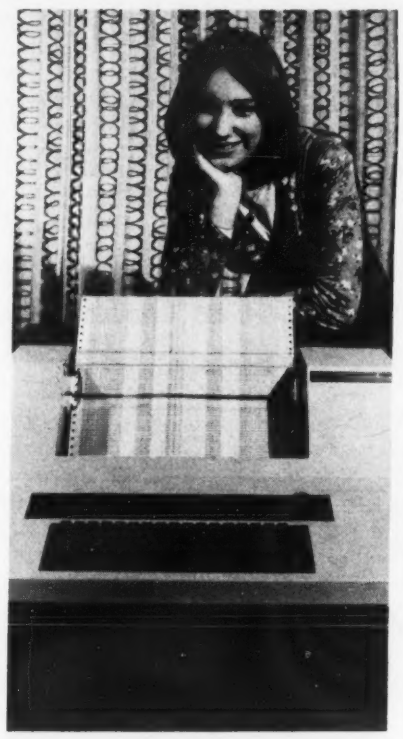

Options include top-of-form, horizontal tabbing, and perforation skip.

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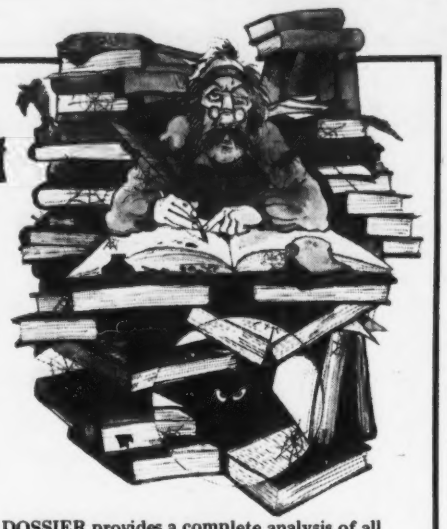

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Panel Dismisses Simulation As Means to Predict the Future

By Edward J. Bride
Of the CW Staff

SAN DIEGO – One of the biggest problems facing users of computer simulation techniques is the simulators themselves, a panel of simulation users concluded here recently.

This apparently applies to many different types of models, but especially when human behavior is the subject of the simulation, panelists indicated.

Speakers chose several different ways of stating that conclusion, but the consensus seemed to be that, since the very process of learning is not understood, it is difficult to predict what people will do when they are impacted by external forces.

One speaker, biologist Howard Pattee, went so far as to suggest that living systems – any organisms – are models themselves of the world, and he added that it is impossible to "simulate a simulation."

The panel was billed as a look at "simulation and other questionable means of predicting the future" but, when all was said and done, the speakers said it couldn't be done.

About the only type of prognostication in which speakers expressed any confidence was mathematical programming and actual data processing, such as computing a country's fuel reserves if supply is cut off and consumption remains constant.

But predicting actual human behavior was dismissed as unfeasible for a variety of reasons.

One panel member commented that a species survives by learning about change and since "we don't know how to write an equation for the rate of change," computerization is difficult.

Another member noted that since it is unknown how organisms learn, it is difficult to predict what they will do under different and varying circumstances.

He also said that people who build models often apologize for them and, feeling some inadequacy, they tend to build the models much too big and sophisticated.

Organisms, i.e., humans, make decisions within only "a few degrees of freedom," he continued, while model-builders try to take every possible event into consideration when building the data base.

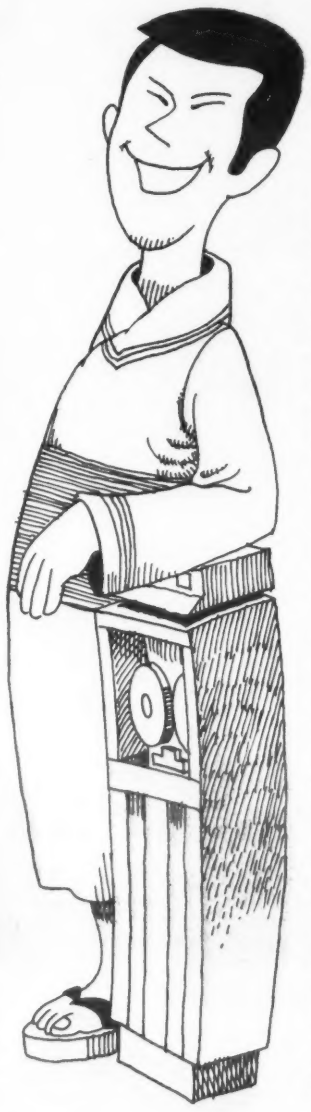
A secondary theme of the session was the need to communicate the effectiveness of simulation – at least as applied to hard facts and not human behavior – to high-level policy in industry and government.

Several speakers, for example, mentioned the Club of Rome project which predicted depleting natural resources in the world. Even if that simulation was based on faulty data or invalid equations, it was "useful" since it called attention to an important problem, speakers agreed.

Dr. H.R.J. Grosch, concluding panel member, stressed this aspect of the Club of Rome, noting its usefulness. He called on his fellow computer technicians to stress the importance of simulation on top-level industry and government figures.

Other panel members seemed to agree that it is misplacing the emphasis to talk about "predicting" the future. Rather, some suggested policymakers can help "shape" the future by simulation.

The "art" of simulating has progressed to the stage that it is wasteful to spend a lot of time perfecting models and "polishing the art," Grosch stated. "The idea now is to communicate the effectiveness of simulation to the right people."



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Shukan Computer, Computerworld's sister publication in Japan, is a joint venture of Computerworld and the leading electronics publisher in Japan, Dempa Publications. Shukan is the only newsweekly for the computer community in Japan and with the combined resources of the two companies, it has the largest news gathering organization of its kind in the world.

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COMPUTERWORLD

Hopper's Prediction Reinforced

Mini Networks Hailed as Big Systems Replacements

SAN DIEGO – Echoing the prediction made by Capt. Grace Hopper that networks of minis will gradually replace more costly 'dinosaurs' in many installations, several users at an ACM session here described their successes with such systems.

Col. Charles Doryland of the U.S. Air Force set the tone of the discussion on distributed minicomputer power by telling the story of what Aerojet Corp. did: "It got rid of the computer."

According to Doryland, Aerojet turned financial disaster into a profitable operation by managing "by objectives" rather than computer-generated management information systems.

"They got their people talking to each other again," Doryland explained, and used computers only where necessary, for specific purposes.

"A company that divests itself of its large computer system provides management great flexibility," according to Doryland. "Excess capacity is a liability, not an advantage; it keeps costs high and management flexibility low," he explained.

Only simple equipment that "provides results now" should be maintained.

As illustrations of minicomputer networks that fill this requirement while at the same time better suiting users' needs, William Sanders described a network designed for Canyon General Hosptial in Anaheim, Calif., and W.J. Lennen described the student-oriented system at Northwestern University.

The operation of a minicomputer network can be distributed according to function, applications or requirements, they said.

The Canyon General system, designed by Information General, Inc., is distributed according to function and consists of separate minicomputers. One operates the executive, which controls input scheduling, another controls the task pool, which communicates with the output scheduler. Two other minis are used for I/O control and communications.

The minis are all located in one room to reduce processing time.

It was also pointed out that Canyon General's network was implemented as an alternative to a system proposed by a large mainframe manufacturer who promised the same service at three times the price and five times the installation time.

The minicomputer system consists primarily of jumbo size Data General Nova machines with low-cost, off-the-shelf peripherals.

In contrast, Lennen's system at Northwestern is highly decentralized, with separate "minicomputers hidden in a closet in every laboratory."

Two basics in designing a system, according to Lennen, are to use the simplest hardware you can to get the work done and don't commit yourself until you know exactly what you're doing.

How to distribute?

Lennen said it's a matter of plain "horse sense."

'Error' Costs Bank Good Credit Rating

SANTA ANA, Calif. – An unexplained "computer error" threatened the reputation of Westlands Bank recently.

Westlands said a $6.6 million computer error involving its deposits with the Bank of America caused unfavorable rumors about Westlands to circulate throughout the state one day in October.

Because the error, apparently in data entry, failed to credit $6.6 million to the Westlands account, Bank of America officials decided "to inform their branches not to honor checks drawn on the Westlands Bank," Westlands stated.

A Bank of America spokesman confirmed "there was a 'computer error' between the two institutions," but both banks were close-mouthed on how it occurred.

Westlands' president said his bank received worried calls from "all over the state" as rumors about the bank's financial health spread.

But Bank of America officials "had been wonderful" in helping to correct the situation, he said.

By the Dusk's Light

COLLEGE STATION, Texas – There are more to sunsets than meet the eye, according to scientists at the Texas A&M University.

Using computers as a measuring tool, it was discovered that a precise mixture of ozones and aerosols is needed to create each unique sunset.

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COMMUNICATIONS AND INFORMATION HANDLING

Railroad Cars Tracked by Scanner Validation System

LOS ANGELES – The Santa Fe Railway Co. is using an on-line computer-to-computer-to-scanner information validation system to gain position information on cars in and out of its Bakersfield and Los Angeles yards.

Now operational after a one-year developmental effort, the system involves a single IBM System/7 polling each of 10 scanners to determine car information. When trains pass scanners, the System/7 gathers and stores the entire Automatic Car Identification (ACI) reading, compares it with previously stored advance wheel reports on incoming traffic and reports the actual car movements to the appropriate yard office.

The ACI is basically an optical mark coded label attached to the side of the car. The advance information is provided to the System/7 by Santa Fe's IBM 370/158 located 1,560 miles away in Topeka, Kan.

In addition to on-line inquiry of the 158's car inventory by Sante Fe personnel, many of the line's major customers also have terminals able to inquire directly into the computer files to determine more quickly the position of their shipments.

"We haven't yet performed a post-audit on the project and computed return on investment," J.B. Leaverton, Topeka's manager of training procedures in the Information Systems Department, said.

"But we have assured ourselves the system does, in fact, pay its way in improving operational efficiency and customer service," he added.

Santa Fe's 158 maintains the perpetual status of each car on the 12,569 route miles of track.

As freight trains are dispatched toward Bakersfield and Los Angeles, an advance consist (wheel report) of these trains is forwarded by Topeka's 158 to the System/7.

The System/7 stores the advance consist awaiting arrival of the train at either Bakersfield or Los Angeles. This information can be retained for up to four days.

When the train does pass an ACI reader, the scanner reads the label identifying the car. After the caboose has passed, the trackside device transmits the car initials and numbers, in the order they passed the scanner, to the System/7.

'Next Readable' Routine

Although about half of the flatcar readings are illegible to the scanner, most carry containers or trailer units with ACI codes of their own, so a simple "next readable" routine was developed to identify cars through association of container or trailer number with the flatcar upon which it is being carried.

When containers or trailers are not involved or are not identifiable as such, the computer automatically checks the sequence of car numbers beginning with the first car in the ACI list, looking for an identical initial and number on the advance consist. Other routines are then brought into service looking to the probability of supplying the information for ACI list zero-reads from the advance consist.

As an example, if cars ahead and behind the zero-read are the same in the advance consist and the ACI consist, the computer assumes the middle car is the same.

Destinations Listed

Enhanced consists are then printed remotely by the System/7 in the appropriate yard office at an IBM 2770 terminal. The enhanced consists include not only standing car order of freight cars but also their owner, destination, consignee, contents and status.

In the finished enhanced consists, the computer indicates probabilities for each of its assumptions. Probabilities are based on mathematical analysis of actual experience.

Yard staff members can quickly note the zero-reads and the actual probability of the "filled-in" numbers' accuracy. If probabilities are low, manual verification may be done.

Comparison, enhancement and printing of the enhanced consist in the appropriate yard office takes from two to four minutes following the caboose's passing the scanner. This compares with the usual two to four hours for a complete manual verification.

In the case of outbound and local yard movements, the System/7 printouts are used by personnel on the outbound desk when reporting back to the Model 158 the actual movement of cars out of the yards, eliminating opportunity for errors in reporting because of last-minute polling of cars prior to departure.

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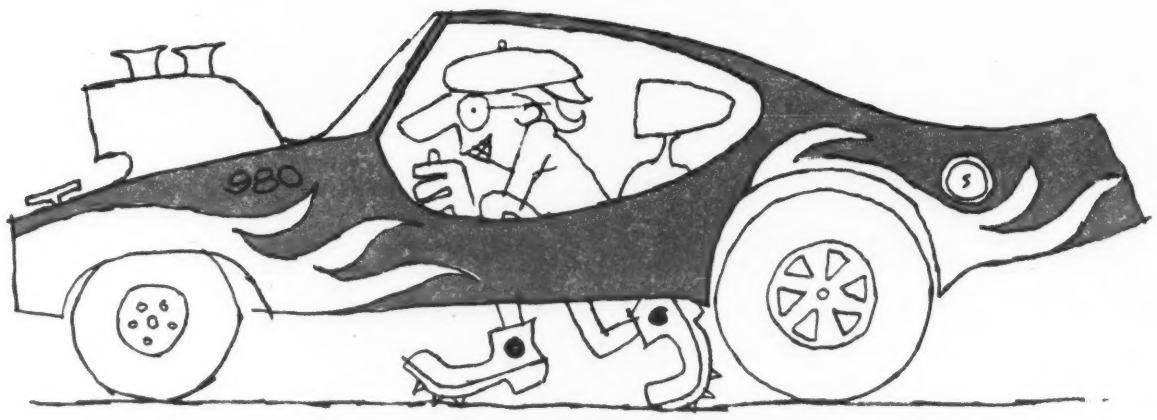

"He also manually programs his NC machine tools."

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COM Readers 'Fulfill' Magazine Subscribers 30,000 Inquiry/Mo

MARION, Ohio – Some days, it seems, the 15 million magazine subscribers served by Fulfillment Corp. of America move around faster than the presses which print the 45 magazines using Fulfillment's services.

The transient readers – and the more than 30,000 inquiries they make each month concerning subscriptions – were the reason Fulfillment elected in 1970 to put subscriber records on computer output microfilm (COM), according to Jackson Taft, the firm's treasurer.

"Impact printing simply could not meet our requirements," said Taft. "It wasted costly mainframe time, produced hard-to-read multiple copies and gave our adjusters a cumbersome means of referencing files."

Mainframe Time Down

"We estimate with the COM unit we installed that our mainframe time has been pared by a ratio of 8.5:1," he continued.

To do the job, Fulfillment opted to acquire a Memorex 1603 COM rated to produce 10,000 line/min, compared to the 1,100 line/min rate of standard printers. The company utilizes 39 Memorex microfilm viewers to aid employees as they answer questions about subscription dates, prices and address changes.

"Keeping up-to-date and answering subscriber questions means that we microfilm about 42 million lines per month on the average," Taft said.

"We use the COM film for about two weeks at the adjusters' desktop viewers. Some are then retained for additional, varied information and eventually the film is discarded and the cassettes reused."

Subscriptions to each publisher are sent directly to Fulfillment's headquarters here where they are filled, billing files established and expiration dates set. This information is in turn transmitted to the firm's COM-equipped IBM 360/30 and 50 computers.

Call for Papers

COMPUTER NETWORKS SYMPOSIUM, June 18, Gaithersburg, Maryland.

Sponsored by the Institute of Electrical and Electronics Engineers (IEEE) Computer Society Eastern Area Committee and the National Bureau of Standards, the one-day symposium will focus on trends and applications.

Papers of a tutorial nature which describe practical experiences with a network or which present new research results are being solicited. Topics may include resource sharing and management, performance evaluation and costs, software and hardware reliability, security, user or system access, private or value-added networks and transportable software.

Detailed abstracts of approximately 1,000 words should be submitted by Dec. 15 to Marvin Zelkowitz, Department of Computer Science, University of Maryland, College Park, Md. 20742.

THE EUROPEAN COMPUTING CONFERENCE ON COMMUNICATIONS AND NETWORKS, Sept. 23-25, London.

Papers are being solicited in distributed processing systems, communications requirements, communications semantics, common interface standardization, network command languages, network interconnection and interaction, data base considerations, systems specification and interfacing, terminal specification, international linking considerations, systems architecture for communications, reliability problems, data security and cost considerations. Papers should contribute to the conference aim of exploring the immediate future of data communications.

Intent to submit a paper should be received as soon as possible. A 1,000-word summary is due by Jan. 7 and a final paper by May 12. Contact: Online, Brunel University, Uxbridge, Middlesex, England.

THE EUROPEAN COMPUTING CONFERENCE ON INTERACTIVE SYSTEMS AND CAD, Sept. 23-25, London.

Papers are invited which will contribute to the conference theme of reviewing the current position of interactive computer methods, consider the design, scope, standardization and future of interactive systems and highlight the major problem areas which remain to be solved.

Topics may include interactive language design, operating system requirements, systems architecture, software engineering, information display and visualization, solid object description, image processing, simulation and modeling, mathematical techniques, man/machine and CAD/CAM interface, system specification and testing and applications case studies.

Intent to submit a paper should be received as soon as possible. Jan. 7 is the deadline for a 1,000-word summary and May 12 for the final paper. Contact: Online, Brunel University, Uxbridge, Middlesex, England.

DPMA Expects 3,000 To Attend Info/Expo

ATLANTA – The Data Processing Management Association (DPMA) expects 3,000 attendees and 150 booths at its International Conference and Business Exposition (Info/Expo), scheduled for June 29-July 2 here.

Six concurrent tracks of educational programming are planned in the areas of management, technical, personal growth and products and services. In addition, the conference will feature educational program sessions.

For information in obtaining booth space, contact Martin H. Bowerman, DPMA's director of programs and services, at 505 Busse Highway, Park Ridge, Ill. 60068.

Societies/ User Groups

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The seminar teaches how to perform a good problem definition for all kinds and combinations of systems efforts: information, transaction, single user, integrated and data base systems.

Today, in most systems efforts, the problem definition (if done at all) is one of the weakest activities. As a result, undiscovered problems continue to be discovered during design, programming, testing and after the system goes operational.

This results in poor design, often not responsive to the user's real needs, poor programmer productivity and considerable change after the system goes operational. With hindsight it is usually evident that most changes in a systems effort and much user disappointment with the new system could have been avoided had a good problem definition been effected in the beginning.

The fee is $135 and classes are limited to 25 students. For a brochure or further information call (301) 762-1288 or write Barnett Data Systems, Suite 507, 1010 Rockville Pike, Rockville, Md. 20852.

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We have participated in, and have often been completely responsible for the design and implementation of the basic software in some of the computer industry's most popular systems: the PDP-8 PAL 111 assembler for DEC; CALL/360 for IBM; the GE-235 time-sharing system for GE. We have been retained by a major government agency and several industrial organizations to train and evaluate their entire EDP staffs. We have communicated our ideas, results and philosophies in over 70 papers in virtually every major American computer publication. A book published by the president of our organization, entitled *Design of On-Line Computer Systems*, has been translated into two foreign languages and is being used as a textbook in over a dozen universities.

We have participated in the design and implementation of some of the most advanced computer systems in the world.
We have conducted nearly 250 training courses for well over 3500 people in a dozen different countries through Europe, Australia, Canada and the United States.

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Robert Townsend has defined a consultant as someone who, when asked for the time of day, will take your watch, tell you the wrong time, and then walk off with your watch. Fortunately, we have enough watches — we don't need yours, and we do know the time of day. We can provide you with very high-powered and very talented people to: solve a specific problem; give advice on a particular EDP subject; provide an ongoing review and audit of technical projects; assume complete responsibility for the design, implementation or management of challenging computer projects.

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TRAINING

Some of our training courses are listed below. We have a number of additional courses available for public and inplant presentations. In addition to the public coureses scheduled for winter 1975, we specialize in tailoring seminars for individual companies; these involve various mixtures of lectures, seminars, workshops and hands-on computer projects. We would be happy to review your training requirements with you.

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New York City March 12-14

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OPERATIONS MANAGEMENT — Phil Dorn's definitive survey of operations management in today's complex hardware/software environment. Includes discussions of data center organizational problems, hardware selection for the future, and performance measurement. FEE: $395.

Washington, D.C. Feb. 26-28

For a brochure containing detailed information on each of these seminars, for inplant presentations of these and other seminars, or to be placed on the mailing list for future announcements, contact Ms. Rikki Moss, YOURDON inc., 575 Madison Avenue, New York, N.Y. 10022 • (212) 486-1757

Long-Range Report Leads ACM to Grapple With Aims

By Edith Holmes
Of the CW Staff

SAN DIEGO – A scientific computer society or a group dedicated to the practical applications and consequences of computing?

Caught between this rock and hard place, the council of the Association for Computing Machinery (ACM) wrestled with the society's purpose during its discussion of a number of issues at a recent meeting here.

A report suggesting future directions for the society presented to the council by the long-range planning committee, for example, brought comments ranging from "ACM overstresses business DP" to "ACM should take a position on trade schools and become more involved in training programs."

Any long-range planning should move the organization "toward a broader society for the world of computing in general," said one councilmember. Another argued the report should be more specific in its discussion of ACM interest in professionalism, certification, licensing and testing.

While the council voted to use the report as a guideline for planning in the 1977-78 time-frame, the body indicated "a fear of a Tonkin Gulf type of resolution" and voted to amend the motion accepting the report by deleting acceptance "of its basic philosophy."

Because no consensus could be reached on whether the report weighed philosophy or procedures too heavily, council members were asked to send preliminary votes on the report to ACM headquarters by Dec. 1 in preparation for final debate on its issues during the body's February meeting.

Dues Increase

Following a report on the society's financial position, the council voted to recommend to the ACM executive committee that it propose a dues increase for fiscal 1977 should the society's liquid position fall below the allowance of three months' operating expenses during preparation for fiscal 1976.

But the body also moved that, when considering the alternatives to limiting the '76 budget, the executive committee should reduce programs before increasing the annual $35 dues. During the course of debate, several members argued the society should not raise dues "without a concurrent increase in service – an increase occurring only if the membership expresses a need for additional service."

Societies/ User Groups

In a vote of 17 in favor and 7 opposed, the council reaffirmed its intent to protect the surplus funds of the special interest groups and committees from future impoundment by ACM unless absolutely necessary.

Several council members argued this resolution was hypocritical because "ultimately the ACM itself matters more" and "if necessary, the funds would be impounded again as they were in 1971."

Vote on Publication

Other "needs of the membership" led the ACM council to vote top priority to expenditures for conducting a survey of the society's 28,000 members to determine what kind of publication they would like to have.

The council is considering proposals from its publications board either to add more nontechnical material to the organization's monthly magazine, *Communications,* or to begin a new book emphasizing the business and less technical interests of its members.

In either case, council members intend this move toward "partial technical unbundling" to attract both a broader range of readers and members and more advertising. Present plans include the gradual addition of feature material, purchased articles, extra pages, a professional editor – and money for the survey to find the means for developing "a more common book."

Concern over its membership files also led the council to draft a letter to all ACM chapters requiring that they use data for mailings which "go to ACM members in the area normally served" by each chapter and which "publicize duly authorized chapter activities and/or support chapter membership drives."

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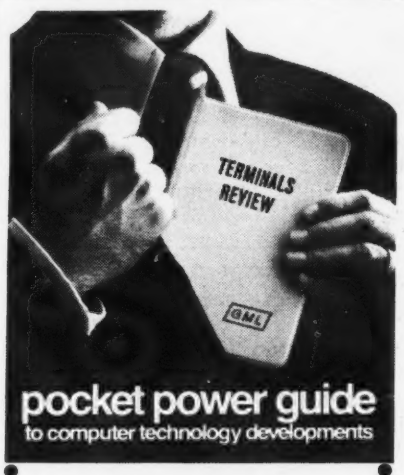

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COMPUTER INDUSTRY

CI Notes

Fujitsu Agrees to Supply Product Technology to CCI

TOKYO – Consolidated Computer, Inc. (CCI) has signed a technical assistance agreement with Fujitsu Ltd. under which Fujitsu will transfer product manufacturing technology to CCI.

Special emphasis will be placed on production engineering, manufacturing engineering and product testing.

The two firms have discussed the possibility of other future joint programs, said William G. Hutchison, president of CCI. Under a previous agreement, Fujitsu markets the CCI Key-Edit 50 system through its subsidiary, Facom Data Terminal Ltd.

Memorex to Furnish BST

SANTA CLARA, Calif. – Memorex Corp. will supply Business Systems Technology with its Memorex 3660 disk drives on a lease and purchase basis over a two-year period.

BST, supplier of add-on memories to the IBM System/3, said it can attach up to four of the drives, which it will call the BST 45, to an IBM System/3 Model 10 with a BST controller.

Memorex will maintain the 3660s and certain other equipment for BST customers. The contract has a potential value of about $3.5 million.

'Watergate a Gnat'

SAN ANTONIO, Texas – The top administrative officer for Southwestern Bell in Texas allegedly committed suicide recently and left a note indicating corruption within the Bell System.

T.O. Gravitt, vice-president of Southwestern Bell, said in his note that "Watergate is a gnat compared to the Bell System."

The Bell official, who died in October of carbon monoxide poisoning, mentioned in another portion of the note a special fund established by Bell for political contributions.

Gravitt's family has filed a $25 million suit against Southwestern Bell claiming that "a company conspiracy" resulted in the executive's death.

Supershorts

The Computer Communications Group of the Trans-Canada Telephone System has received Canadian marketing rights for Data Measurements Corp.'s DMC 220 and 442 terminals.

– – –

Datametrics, Inc. has received a patent for its Nofault automatic self-testing programmable controller. The patent includes components developed for the system such as memory addressing logic.

In Quantum Study for Adapso

Service Revenues Seen Doubling by '79

By Toni Wiseman
Of the CW Staff

MONTVALE, N.J. – Computer services revenues amounted to $5.1 billion in 1973, a 20% increase over 1972, according to a report of the Association of Data Processing Service Organizations (Adapso).

Revenues in the services industry will more than double by 1979, reaching $13.4 billion, after pausing at $6.9 billion in 1975, the study said.

Several trends emerged from the survey, conducted by Quantum Science Corp. Among them were increased profitability in all sizes of service firms; a strong thrust toward network information services (NIS) and away from batch; and product and/or industry specialization.

Of the $5.1 billion in 1973 revenues, $3.6 billion was generated by data services, a 28% increase over the 1972 figure, and $1.5 billion from support services, up 5% from 1972.

Firms reported an average net profit of 2.9% compared with 1.6% in 1972 and a 6.6% loss in 1971. Average operating profit was 6.8% of operating revenue, compared with 6.4% last year.

The highest profits were shown by small firms, those reporting less than $400,000 in annual revenues.

The study showed that 76% of revenues were derived from batch operations, compared with 24% from NIS. The smaller the company, the higher its percentage of batch revenues, the study indicated.

By 1976, however, a considerable shift to NIS is anticipated, the study said, so that batch operations will account for a reduced share of revenues: 57% in 1976, down from 76% in 1973.

Economic Crunch

The industry demonstrated its maturity in the manner in which it weathered the economic crunch of 1973, the report stated. "Indeed, many vendors, particularly NIS vendors, were able to take advantage of the difficult situation to increase revenues."

The survey, conducted during the first quarter of 1974, pointed up possible results of an economic recession. It revealed that 68% of end users "anticipate budget cuts if a recession does occur" and plan to increase their use of computer services as a result of internal cutbacks.

With budget reductions, software development (including programmers) and peripheral hardware would be the first to go; the future prospects for service organizations are therefore even more encouraging than 1973 results, according to the report.

FM Viable Approach

Facilities management (FM) has proven a viable approach to data processing, with large and very large businesses accounting for the greater share of total FM revenues which amounted to $977 million in 1973, the report said.

Revenues from the manufacturing, finance and banking and insurance industries will account for 53% of all industry revenues in 1974, up from last year's 48%, the report predicted.

The NIS market, the study noted, consists of 27% of all available data services and will continue as the largest available service market up to 1979, when FM will draw even, with both sectors representing 33% of the total market.

"In 1974, 96% of all NIS revenues will be available to [NIS] independents, decreasing to 93% in 1979, indicating a very stable available market in spite of the competition from services customers such as banks and insurance companies," the report stated.

Software products are making heavy inroads into the custom software markets in applications specialties, the report said. IBM is continuing as the dominant force with over 800 packages available and 40% of total revenues.

"Software services customers are being converted to software products, causing an overall decline in sales of software services as a share of total computer service expenditures," the report noted.

The major trends in the sector, it observed, are toward industry and applications specializations.

The report predicted a tripling of revenues this year from finance and banking in batch service bureaus, resulting from the inclusion of "captive batch revenues accruing to correspondent banks" for the computer services provided to smaller banks.

Looking at the distribution of the available market for data services, the report noted that in 1973 NIS accounted for $737 million or 27% of the market, batch service bureaus for $717 million or 26%, facilities management $592 million or 22%, software services $440 million or 16% and software products $260 million or 9%.

1979 Prediction

Looking ahead to 1979, the report forecast FM and NIS at $2.65 billion and $2.67 billion respectively or each with 33% of the available market.

The following sectors will have a smaller share of the larger market: software products, $1.15 billion or 14%; batch service bureaus, $974 million or 12%; and software services $681 million, or 8%.

A breakdown of revenues by size of customer showed 36% of those with annual revenues under $100,000 in 1973 spent less than $5,000 for computer services.

The majority 82.2% spent less than $25,000, and the remaining 17.8% spent to more than $25,000.

In the category of customers with annual revenues between $500,000 and $1 million, 11.5% spent less than $5,000 for services; 51.8% spent between $5,000 and $25,000; and 3.8% spent more than $25,000, the study said.

Of those with annual revenues of $10 million, 57.3% spent anywhere from $5,000 to over $25,000 and 15.3% spent $25,000 or more.

The energy crisis, inflation and economic uncertainty have impacted the computer services industry, but it has not suffered to the same extent as some other industries, the report said.

These problems have forced users to reevaluate budgets and priorities, with batch service bureaus and NIS firms benefiting as sources of overload processing as well as of special applications processing, it concluded.

Semiconductor Market Growing Despite Slight Dip This Year

NEWTONVILLE, Mass. – The demand for semiconductor products in the computer industry and general manufacturing is still strong and should support 25% growth in integrated circuits in 1975 and 1976, according to a recent International Data Corp. (IDC) study on semiconductors.

The IDC study showed that despite a slight slip in growth in 1974 – to 15% in the U.S. semiconductor consumption – the growth rate should increase in 1975.

Computers will continue to be the semiconductor industry's key market, growing in share of sales from 23% this year to an estimated 29% in 1980, according to IDC.

Microprocessors and memory markets will become even more important as major consumer markets reach saturation.

The report details the 1975 demand forecast which can be used to gauge the expected purchases of circuits by U.S. mainframe, minicomputer, memory system and terminal companies. Microprocessor and memory studies help identify market potential in 1976 and beyond by customer type and end use.

The price of the basic study is $2,500 with a full continuing program, including two memory studies, available at a subscription cost of $10,000.

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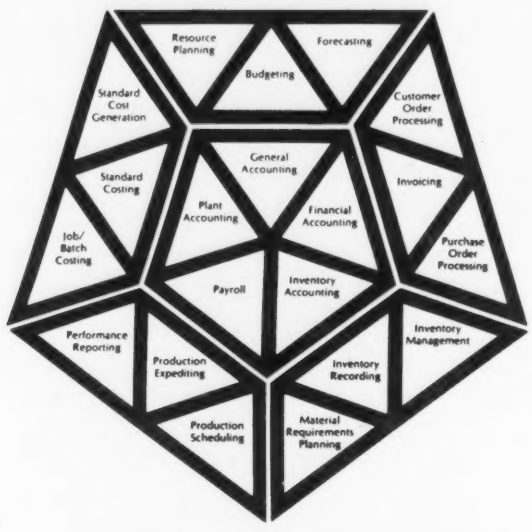

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Expects Depressed Quarter

CDC Plans Cost Curtailments

MINNEAPOLIS – In the face of anticipated depressed results during the fourth quarter, Control Data Corp. (CDC) is attempting to reduce assets and operating costs, including curtailing some technical programs, according to William C. Norris, chairman of the CDC board.

Inflation and high interest rates have continued to put pressure on computer profit margins, Norris explained in a third-quarter report to shareholders.

Interest costs have been further aggravated by substantial additions to computer equipment leased to customers, he added.

Belt-tightening measures include reducing assets by tightening controls on inventory, receivables and other assets in order to minimize additional borrowing.

CDC is also attempting to cut operating costs by reducing expenditure rates on some business and technical development projects and shelving some others, as well as "small reductions" in the work force and requiring computer employees to take five unpaid vacation days before Jan. 1.

There will be some plant consolidations and some technical programs terminated among programs particularly affected by higher cost and interest levels.

These actions are expected to result in write-offs of undetermined amounts to be charged against earnings in the fourth quarter, the company said.

The write-offs are in addition to the previously announced $30.2 million pretax special charge taken against earnings in the third quarter. The latter item resulted from the discontinuance of a joint-development project with a Swiss bank.

Lockheed Division Forming A New Dealers Association

LOS ANGELES, Calif. – Lockheed Electronics' Data Products Division is forming a new dealers association this month as part of an effort to share software developments and ideas and communicate as a group with Lockheed, according to Gene Sylvester, marketing communications director.

Lockheed Electronics' System 3 business systems are marketed through software houses and service bureaus under an arrangement that gives dealers a percentage of profit on each system sold, in addition to fees for developing custom software for each customer.

According to Sylvester, an informal arrangement presently allows a dealer in Los Angeles, for example, to obtain completed applications software from another dealer in Cleveland, making it unnecessary to "rewrite another payroll system," he said.

These sales are "gravy" for them, he said, and the dealers association will formalize that arrangement.

Many service bureau users become Lockheed System 3 users when their processing needs make the service bureau approach too costly, Sylvester explained.

The dealer using the System 3, often a service bureau operator, is right there to provide the customer with the system, software support and, in addition, compatible service bureau processing at peak times.

The System 3 is the only Lockheed system sold through dealers rather than Lockheed's nationwide direct sales force, Sylvester said.

The System 3 is IBM-compatible and software includes a foreground/background multiprogramming disk-operating system, an RPG II compiler, sort/merge, source and data entry packages, an assembler and a complete set of utilities.

Programs also allow conversion of source programs and data files from IBM System/3 disk packs, he said.

Systems Lockheed sells through its direct sales force include the System User Engineered (SUE) micromodular minicomputer and MAC 16, which is designed for real-time systems.

While the sale of the three computer systems constitutes about 50% of Data Systems' business, printed circuit boards and memories, sold to such large system manufacturers as Burroughs and NCR, make up the balance of the company's revenues, Sylvester said.

Expansions

Interactive Data Services, Inc. has relocated its office in Waltham, Mass., to 22 Cortlandt St., Boston, in the financial district, in order to expedite delivery of pricing tapes.

Centronics Data Computer Corp. has begun manufacturing operations at new plants in Dorado, Puerto Rico and Londonderry, N.H.

On-Line Systems, Inc. has begun construction on a four-story, 45,000-sq-ft addition to its headquarters in Pittsburgh, Pa.

The Special Systems Division of NCR Corp. has moved into three buildings with combined space of 42,500 sq ft in the Torrey Pines Business Park, San Diego.

Computer Automation, Inc. has more than doubled the size of its British subsidiary, CAI Ltd.'s facilities at 31/35 Clarendon Road, Watford, Herts, London.

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Telex Decision Could Prompt More IBM Suits

If an industry's maturity can be measured by the number of lawsuits filed against leading firms, then the DP industry is growing up fast.

The Computer Industry Association (CIA) has compiled a list of some of the suits pending against IBM, and the list mounts almost monthly. Not only are there new suits, but old ones have a way of lingering on in the appeals process.

Many of the suits filed recently are based on claims generally similar to those in the Telex suit. Depending on the outcome of the long-awaited appeals decision from the normally prompt 10th Circuit Court, there could be a rash of more antitrust suits against IBM.

In California, several cases have been consolidated for pretrial discovery under Judge Ray McNichols.

Counsel for Marshall Industries, Hudson General and Transamerica has moved to arrange these cases for trial during the coming spring. IBM attorneys indicated they preferred a consolidated trial of all cases on the "so-called Telex issues," and Judge McNichols took the motions under advisement.

The next pretrial hearing is scheduled for Dec. 17.

Meantime, on the East Coast, Judge David N. Edelstein is meeting with IBM and Justice Department attorneys with increasing frequency in attempts to clear the decks for that trial.

Although the suits filed in the wake of the initial Telex settlement are numerous and could become even more so if the appeal rules in favor of Telex, there is another type of suit that could potentially outnumber those filed on antitrust grounds.

In a little-publicized case, Equity Funding shareholders have sued IBM for failure to warn or protect them from fraudulent use of IBM computers. The case is on appeal, according to the CIA.

Suits Pending Against IBM

PLAINTIFF	DATE FILED	COMPLAINT	RELIEF REQUESTED		STATUS
U.S. Government	1/17/69	Monopolization of general purpose market	Restructure Company	—	Trial planned early 1975
Greyhound	1/71	Monopolization of leasing market	—	$ 105 Mil.	Dismissed by lower Court On Appeal in 9th Circuit
Symbolic Controls Corp	11/16/71	Predatory practices in software market	—	To be determined	Pretrial discovery
Telex	1/21/72	Monopolization of the plug compatible peripheral market	End illegal practices	$ 259.5 Mil.	Telex awarded $259.5 mil on appeal. 10th circuit
VIP Systems	12/70	Conspiracy between IBM and SBC to monopolize computer services market	Prohibit IBM activities	$ 45 Mil.	Pretrial discovery
Data Research Corp. Western Union Computer Utilities International Data Terminals	3/71	Antitrust	—	$ 1.38 Bil.	Pretrial discovery
Mira-Pak	7/73	Attempt to monopolize dry food packaging machinery market	End illegal practices	To be determined	Trial begins 1/75
SBC Employees	12/24/73 (amended)	Violation of employment contracts through sale of SBC to CDS	—	$ 3 Mil.	Pretrial discovery
Equity Funding Shareholders		Failure to warn or protect shareholders from faudulent use of IBM computers	—	$ 10 Bil.	Court sustained IBM demurrer; shareholders appealing
Vernon M. Bugg	9/19/73	Conspiracy with AT&T in restraint of trade in teletypewriter market	—	$ 120 Mil.	Dismissed—Statute of limitations expired
California Computer Products	10/3/73	Monopolization of Peripheral market	Injunctions & Divestiture	$ 300 Mil.	Consolidated for Pretrial discovery
Transamerica Computer	10/73	Monopolization of Peripheral market	" "	$ 150 Mil.	" "
Hudson General Corporation	11/30/73	Monopolization of Peripheral market and leasing market	Injunctions & Divestiture	$ 84 Mil.	Consolidated for Pretrial discovery
Memorex & ILC	12/14/73	Monopolization of Peripheral market and leasing market	Injunctions & Divestiture	$ 3.15 Bil.	Consolidated for Pretrial discovery
Marshall Industries	12/26/73	Monopolization of Peripheral market and leasing market	Injunctions & Divestiture	$ 108 Mil.	Consolidated for Pretrial discovery
Levin Computer Company	6/24/72	Predatory practices	End illegal practices	To be determined	Levin refused injunctive relief; on Appeal 3rd Circuit
Catamore Co.	5/9/74	Monopolization of software and systems consulting markets; fraud	—	$ 62 Mil.	Pretrial discovery
DPF, Inc.	9/10/74	Monopolization of Peripherals market	—	$ 45 Mil.	Precertification
Forro Precision, Inc.	8/6/74	Monopolization of peripheral equipment components market	—	$ 36 Mil.	Pretrial discovery
Memory Technology, Inc.	11/4/74	Monopolistic practices in memory market	—	$ 168 Mil.	Pretrial discovery

This list of lawsuits pending against IBM was compiled by the Computer Industry Association for its publication, *On-Line*, and updated by *Computerworld*.

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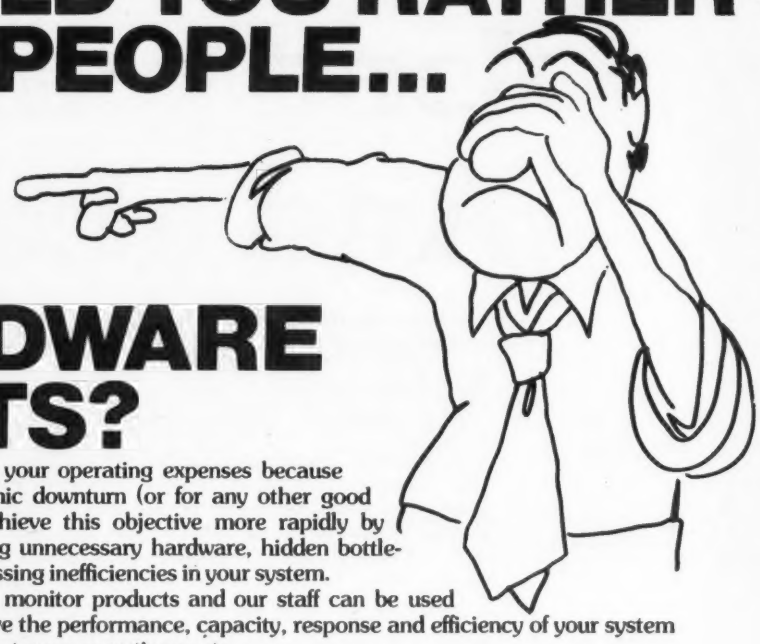

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Small Systems Peripherals Seen Reaching $5 Billion Mark by '83

NEW YORK – The peripherals portion of the small business computer market, which produced sales of $248.3 million last year, is expected to exceed $5 billion in 1983, according to a report published recently by Frost & Sullivan, Inc., market researchers.

Data entry, auxiliary and printer output equipment for IBM System/3 users will be the key market area, the report said.

Data entry equipment, including keypunches, keyboard-to-storage devices, optical readers and alphanumeric display terminals will account for approximately 50% of the $5 billion total, the report said, with auxiliary storage and printers sharing the other half.

Specifically, data entry equipment sales, which reached $215.3 million in 1973, will rise to $2.63 billion in 1983, with sales of auxiliary storage equipment expected to hit $1.34 billion in 1983 compared with $21 million in sales reported in 1973.

Printers will claim $1.18 billion in sales in 1983, compared with $12 million in 1973.

Frost & Sullivan predicted the keypunch market will be sharply affected by small key-to-disk systems as users become aware of their economy of operation as well as their ability to alleviate the computer's workload.

Sales of key-to-disk systems will rise to $600 million during the next 10 years, with most significant sales coming in the late '70s, the study said.

The survey, which showed 500 key-to-storage units sold in 1973, predicted 5,500 such units would be sold in 1976 for a revenue total of $39 million. Sales in 1983 are estimated at $90 million.

Optical readers will gradually replace centralized keying by automatic capture of field and office-generated data, according to the report. Sales should jump from 100 units sold in 1973 to 1,500 units in 1976, for a total of $30 million that year.

Sales in 1983 should reach $50 million, the study said.

Finally, alphanumeric display terminals will be adopted extensively in the small business computer field for direct data entry from multiple terminals and especially for data base inquiry.

Terminals sold to small business system users generated $6 million in sales in 1973 and will generate $14 million in 1976 and $50 million in 1983, the report said, adding this total does not include displays sold as part of key-to-disk systems.

"In essence, the alphanumeric terminal represents a major component in the new small business computer system," the report said.

Peripherals sales will be strong in the IBM System/3 Model 10s, but IBM's introduction of the Model 15, with larger and more cost-effective storage units, may forestall market intrusion by independents, Frost & Sullivan predicted.

"Present user satisfaction, coupled with our recent survey indicating user willingness to select independents," suggests independent storage unit sales will exceed $1.3 billion during the 1974-83 time period, the researchers said.

However, that total for the independents still represents only 10% of auxiliary storage sold to small systems users, the survey said.

Printers used in off-line applications will be an element of the small key-to-disk systems, thus transforming them into true I/O-type systems, the report indicated.

In addition, lower-cost line printers are expected to be added to present small computer systems. Sales will increase sharply from the $12 million recorded in 1973 to $65 million in 1976 and triple to $195 million in 1983, the report said.

The complete report may be obtained from Frost & Sullivan at 106 Fulton St., 10038.

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Computerworld's Year-end Review and Forecast -- in our special combined issue -- Dec. 25 and Jan. 1.

It's good to stop every once in a while and ask yourself "What happened?" And that's just what we'll be doing in our annual Year-end Review and Forecast. All the important stories of the '74 computer world will be covered from the perspective of passed time. Then, of course, we'll take out our well-worn crystal ball and cast our eyes to the future. What's to be expected in '75? Good or bad, we'll take a shot at it in our special, combined December 25th and January 1st issue. If you're in the computer world, this is one *Computerworld* you should be reading very carefully.

If you're marketing to our world, put this issue on your schedule. Color close is December 6th. Black and White closes December 13th. Contact your *Computerworld* salesman for all the details. Or call Judy Milford at (617) 965-5800.

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Contracts

Brandon Awarded LEAA Job

Brandon Applied Systems, Inc. has been awarded a contract by the Law Enforcement Assistance Administration (LEAA) of the U.S. Department of Justice to develop policies, guidelines and procedures for data processing and communications systems and to update and expand the "Directory of Automated Criminal Information Systems."

National Sharedata Corp. has signed a five-year contract with the First National Bank in Wichita, Kan., to direct operations for the bank's DP facility and market automated banking and commercial services.

International Compumedics Corp., provider of computerized health exams, has received a contract from the U.S. Department of Health, Education and Welfare for 8,000 comprehensive physical examinations of federal employees.

Of course you should.

The EDP Seminar Series gives you the information you need to keep ahead of this fast-changing industry.

We've selected leading experts from around the country to give seminars on some of the most important topics on today's EDP scene. These seminars are current, practically oriented, and packed with detailed information. They will help you save time and money. And they can give you the information you need to increase your installation's efficiency. In an increasingly complex and fast-changing EDP world, these seminars are even more important to your company, your installation, and you. Here is our current seminar schedule:

Data Communications

Includes SDLC, HID-LoD, and other topics that weren't even heard of a year ago.

Data Communications is a complicated and rapidly changing field. And this seminar will give you the information you need to keep on top of the subject. Led by the nationally recognized teleprocessing consultant, Dr. Dixon Doll, the course covers recent changes in areas like SDLC, HiD-LoD, DDS, newly approved major revisions to WATS, and the impact of satellite carriers and specialized carriers.

The course will also cover general data communications topics, including intelligent terminals (performance and selection criteria), network software handlers (e.g. CICS) and network organization and design. And, you'll learn about saving money using such innovative concepts as split-stream modems, remote-multiplexers/concentrators, diagnostics for fault isolation and front-end processors.

All participants in this seminar will receive a 2-volume loose-leaf outline of all course materials (prepared by ICC Institute), a copy of "Data Modems Selection and Evaluation Guide" by Vess V. Vilips and a "Data Communications and Teleprocessing Dictionary".

You should attend this seminar if you are currently involved in data communications on a management or operational level and wish to expand your knowledge of the field – or if your company will be going into this area in the near future.

This seminar runs two days, and total cost, including workbook, reference materials, luncheons and continental breakfasts is $350. Additional registrants from the same company qualify for a reduced rate of $300. Current schedule is as follows:

Los Angeles	Los Angeles Marriott (Airport)	January 13 - 14

Data Base Management

A practical approach to the design and implementation of data base systems.

The difference between an effective data base system and a waste of computer time and memory lies in effective planning, system selection and management. And this course gives you both the information and the basic experience you need for the proper design and implementation of a data base system.

Given in association with Leo J. Cohen and Performance Development Corporation, this course covers a comprehensive list of topics, including:

- *the description and definition of the Data Base System Project.*
- *the development of a full-service analysis and system design.*
- *optimum file organization and indexing techniques.*
- *all available indexing techniques and their implementation.*
- *all aspects of system management.*
- *and much more.*

One of the key features of this course is the workshops, in which you'll apply what you've learned. And before you're finished you'll have "done" a complete, on-line order entry / inventory management system.

You should attend this seminar if you are (or will be) involved in the design and implementation of a data base system – whether as a DP Manager, Data Base Administrator, Planner, Analyst or Programmer.

This course runs for 3 days, and costs $350, including course materials, continental breakfasts and luncheons. Additional registrants from the same company qualify for a reduced rate of $300. Current schedule:

Denver	Denver Hilton	December 9-11
Boston	Sheraton Boston	February 10-12

Contracting for Computers and EDP Support Services

A seminar that can help you protect your EDP investment – and your system.

In an industry that's famous for its "promise them anything" attitude, you need good, effective contracts from the vendors that supply your installation. And this seminar gives you the information you need to get them. It will show you how to protect your installation from late deliveries, inadequate equipment or services and the costly disruptions that they can cause.

Course topics include the lease and purchase of computer systems, separate hardware and software – the purchase of time sharing, data processing services and consultation – and the use of facilities management.

Under the personal instruction of Roy N. Freed, a nationally known lawyer, author and expert in the field of computer law, you'll learn how to place yourself in a strong bargaining position, how to insure on-time delivery of exactly what you want, how to set reasonable performance standards for warranties – and much more. You'll also receive a complete resource notebook, *including sample vendor contract forms.*

You should attend this seminar if you are involved in the purchase of EDP equipment or services, whether as a corporate counsel, contract administrator, DP manager, consultant or officer of a using firm.

Cost for the entire 2½ day seminar, including complete resource notebook, continental breakfasts, luncheons and coffee breaks is $295.00. The current schedule:

Los Angeles	Los Angeles Marriott (Airport)	January 15 - 17
Chicago	Hyatt Regency O'Hare	February 26-28

Operating Systems and Virtual Storage

A seminar on more efficient operation of your computer system.

Large installations now expect many programs to run simultaneously *and* efficiently. And that's what this 2½-day seminar is all about. Under the leadership of Dr. Ivan Flores, author of 14 books and one of the world's most prolific writers on systems software, you'll gain an excellent technical knowledge of your operating system, OS and VOS. The course uses the IBM/370 as its subject computer, because of its popularity, and includes these topics:

- Overview of Operating Systems
- Hardware aspects of Operating Systems
- Job Management
- Task Management
- Data Management
- Virtual System Philosophy
- Virtual Hardware
- Virtual Storage Operating Systems

Everyone involved with operating systems can benefit from this seminar. Programmers can employ its lesser known features. The manager can choose an operating system and options to handle *his* installation more efficiently. The chief operator can understand what's happening and better manipulate the system. The executive can determine the requirements for his plant.

Cost for the entire seminar, including course materials, luncheons and continental breakfasts is only $295. Current schedule: New York February 3-5
St. Moritz Hotel

THE EDP SEMINAR SERIES sponsored by COMPUTERWORLD

Key-to-Storage Systems

How to evaluate and optimize the various successors to keypunch equipment.

Data entry is a big problem – and a big headache – as every computer user knows. It is therefore a prime target for cost savings. This course is designed to help you in the practical aspects of selecting, installing, and making the best use of keyboard-to-storage systems. It is an expansion and an update of our successful key-disk seminar. Under discussion (including some user case studies) will be:

- Introduction to data entry concepts (keypunch, buffered keypunch, keypunch, key-disk and beyond . . .)
- Key-disk hardware and software
- Evaluating . . . and starting . . . key-disk systems
- Selecting and operating intelligent terminals, both key-to-cassette and key-to-floppy disk
- Key-disk as a remote batch terminal
- Supervisor functions; motivation
- Mixed Media systems
- Trends in Computer Data Entry

This seminar is lead by Lawrence Feidelman, President of Management Information Corporation, and one of America's leading experts on data entry. All participants will receive a copy of "Data Entry Today", Management Information Corporation's authoritative publication on every aspect of data entry, including a six-month update of this continuing reference service.

You should attend this seminar if you are concerned with optimization of your data entry shop, and especially if you are considering or currently using key-to-storage systems more advanced than basic keypunch. Cost for the 3-day seminar is $350, including continental breakfasts, luncheons, and all course materials. Additional registrants from the same company are charged only $300.

Los Angeles	Sheraton Inn (Airport)	February 3-5
New York		April 21-23
Chicago		June 9-11

To: Ed Bride, Vice President, Editorial Services, Computerworld
797 Washington Street, Newton, Mass. 02160

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NOTE: If time is short, you may reserve space at any seminar by calling collect. Call Marcia Hewett at (617) 965-5800.

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Israeli DP Manufacture Small But Growing

Special to Computerworld

TEL AVIV – With the increasing use of computers in this country, efforts are also underway to turn the world's preoccupation with DP into a source of foreign exchange earnings.

In May, there were 391 computers in use in Israel, including 261 small ones. This total represents an increase of about 9% since the end of the previous year. In December 1972, Israel had 312 computers; in December 1970, only 176.

This trend is expected to continue; available information indicates that the total number of computers in the country will approach 440 by the end of this year.

Breakdowns of the overall number, prepared by the Central Bureau of Statistics, indicate there will be 25 large computers by the end of the year, compared with 13 four years earlier.

Large computers are those that cost $18,000/mo and up; medium from $7,000/mo to $18,000/mo; small from $2,000/mo to $7,000/mo, and very small less than $2,000/mo.

The number of medium installations will rise from 21 to 44 and small sites from 44 to 75 by the end of the year. Very small installations will score the largest relative advance, from 95 in 1970 to 287 at the end of 1974.

Nearly 100 computers are used by manufacturing firms; more than 50 belong to DP service bureaus. Financial institutions operate more than 80 computers; all of Israel banking has switched to automated accountkeeping.

Three installations serve agriculture; the kibbutz movement has long realized the management potential inherent in DP and operates its own large service bureau, which serves the individual settlements.

Well over 90 machines are used by the government and other public services, such as the National Insurance Institute. Practically all tax collection and municipal authority activities now are automated. The defense establishment also makes extensive use of DP technology.

An Israeli Computer Industry

The growing domestic market and the rapidly expanding international demand have encouraged Israelis to investigate the feasibility of manufacturing computer hardware in this country.

Although that industry here has hardly gotten past its initial stage, significant progress already has been made and the future looks promising. Israelis specialize in the manufacture of peripherals and very small computers.

At present, the industry numbers eight separate enterprises. Largest of these is Elbit Computers Ltd., the only Israeli firm to build complete computers.

A small model – the CR 17 – is compatible with Control Data Corp.'s CDC 1700 series. The company also supplies custom DP systems.

Direct exports of Elbit stood at $1.3 million in 1972-73, rising by some 50%, to about $2 million in 1973-74.

Most of the other firms in the field in Israel make components and peripherals. Major American companies participate actively in some of them.

Monsel Ltd., a subsidiary of Monsanto Co., makes digital test and measuring equipment. Infomag Israel, owned partly by Information Magnetics, Inc., produces magnetic heads for computer memories.

International News

This year the industry's overall output has been estimated at $21.6 million, more than double what it was two years ago. By 1977 it is again expected to double, and more, to some $46.5 million.

Since 1972 the average annual growth rate was 47%; for the next three years it has been projected at a relatively "modest" 30% annually.

Exports consistently expand more rapidly than total sales. From $2.5 million in 1972, the industry's foreign exchange income advanced to $11 million during the current year, with a further growth to $35 million forecast for 1977.

Exploring Know-How

Many economists believed Israel's major gain from data processing industry exports would be in the field of engineering services and software. Since skilled professionals here are paid significantly less than in America or Western Europe, it was thought their work could be sold as a product abroad.

To some extent, these expectations have come true, although as yet on a fairly limited scale.

Initially many had hoped Israeli service bureaus would be able to "go abroad," rapidly increasing the foreign sale of their skill and know-how.

So far, hopes for large-scale software exports have not yet been realized. Some progress has been made, but volume amounts to no more than a drop, compared with the potential market for software sales abroad.

Small Size

The reason for this relative lag probably lies in the small size of individual Israeli firms. The domestic market does not justify more than slow and cautious expansion; the relatively small staffs of the companies does not enable them to compete for most of the work to be had in the international market.

Time and increasing cooperation with investors from abroad should remedy this difficulty. Invariably prospective foreign partners are requested to assure marketing channels for Israeli software exports, on a scale that would justify assembling a large and capable staff under a single roof.

With Israel's expected affiliation with the European Common Market and the concurrent easing of import controls on American goods, domestic manufacturers will face additional competition in their home markets. When that occurs, exports will not only be vitally important for the national economy; they will also make or break many individual firms.

Israel's hope for successful competition in foreign markets depends on its ability to make quality and precision goods in relatively small quantities and on short notice.

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Baltimore, The Quadrangle–Cross Keys	(301) 323-7770
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Buffalo, 1310 Liberty Bank Bldg.	(716) 842-0801
Charlotte, 4801 E. Independence Blvd.	(704) 535-3370
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New York, 330 Madison Ave.	(212) 986-1300
Omaha, 7101 Mercy Road	(402) 397-8107
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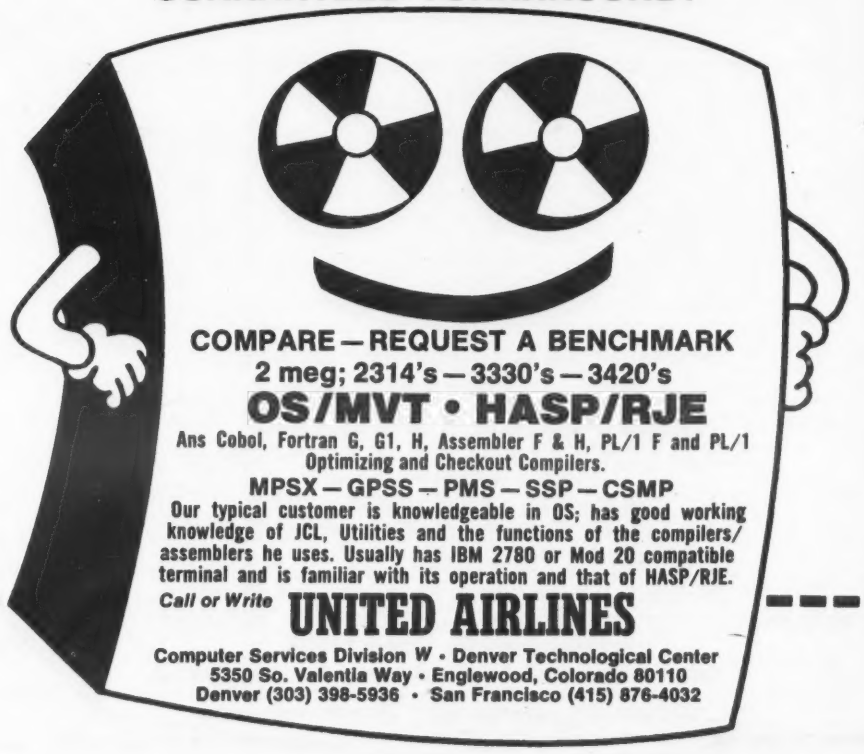

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Position Announcements

SYSTEMS PROGRAMMERS

Two senior programmer positions available approximately January 1, 1975. Will exercise independent discretion and judgment in maintaining, generating, and benchmarking the operating system. Also research, develop, and implement modifications to standard operating systems, drivers, loaders, special software, and system utilities. Requirements include bachelor's degree in Computer Science or related fields, four years minimum programming experience, preferably in maintaining medium to large scale, CDC operating systems such as SCOPE or KRONOS, using COMPASS assembly language. Salary commensurate with qualifications.

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Fort Collins, Colorado 80523

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2. Date of filing: October 1, 1974.
3. Frequency of issue: Weekly (except: a single combined issue for the last week in December and the first week in January); dated Wednesday.
4. Location of known office of publication: 797 Washington St., Newtonville, Mass. 02160. (Middlesex County).
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6. Names and addresses of the publisher, editor, and managing editor: Publisher, Patrick J. McGovern, 60 Austin St., Newtonville, Mass. 02160. Editor, Drake Lundell, 797 Washington St., Newtonville, Mass. 02160. Managing Editor, none.
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B. Paid circulation		
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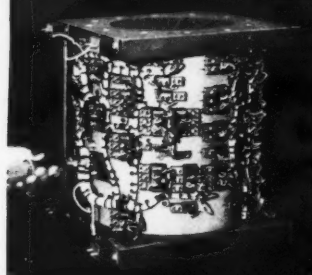

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Telex 2d Quarter Moves Into the Black

TULSA, Okla. – Telex Corp., which amassed a loss of $23.3 million last year, has shown earnings of $221,000 in the second quarter and $386,000 during the six months period.

The Computer Products Group's operations continue to be unprofitable, but to a lesser extent than last year, while the Communications Group is the breadwinner.

Earnings Rise

During the quarter, revenues for the firm rose to $27.4 million from $22.6 million in the year-ago period while earnings reached $221,000 or 2 cents a share compared with a loss of $6.2 million or 59 cents a share in the same period last year.

The Computer Products Group showed a loss of $288,000, and the Communications Group earned $509,000.

During the six months, Telex revenues climbed to $56.9 million from $42.3 million while the bottom line showed earnings of $386,000 or 4 cents a share compared with a loss of $10.2 million or 97 cents a share for the year-ago period.

The Computer Products Group showed a loss of $720,000 for the six months while the Communications Group contributed profits of $1.1 million for the half year.

Improved Showing

A marked increase in sales of equipment contributed to the improved showing by the Computer Products Group, the firm said, adding that although it continues to emphasize sales of equipment to financial institutions and end users, there can be no assurance the level of sales can be maintained in future periods.

A reduction in the level of peripheral equipment sales would adversely affect the operating results of the Computer Products Group.

The reduction in quarterly rental income from leased peripheral gear, $5.7 million compared with $6.2 million last year, is due primarily to sales of equipment that had been on lease with customers, Telex said.

Orders for sale or lease of equipment were down from those a year ago to a sales value of $20.8 million compared with $32.8 million as of Sept. 30 last year.

As of Sept. 30, Telex had an available operating loss carryforward tax credit totaling $12 million. In addition, investment tax credits of $991,000 are available to reduce future income tax liabilities, the firm said.

Potter Expects $9 Million Loss

PLAINVIEW, N.Y. – Potter Instrument Co. said it expects to report a loss between $9 million and $10.5 million for the year ended June 30.

Although figures are not final, President George W. May estimated the loss would consist of about $2.3 million from operations, a write-down of about $6.3 million in values of inventory and leased equipment and other adjustments of about $1.4 million.

Potter's nine-month report showed earnings of $1 million or 37 cents a share on revenue of $39.3 million, although it lost $616,720 in the third quarter.

Change in Accounting Enlarges Keydata's Quarter, Year Losses

WATERTOWN, Mass. – Keydata Corp. increased its losses for the fourth quarter and year by adding a $2.4 million special charge from a change in accounting.

Marketing and product development costs are being expensed as incurred; they were previously deferred.

For the year, the firm lost nearly $3 million or $1.10 a share compared with earnings of $847,000 or 30 cents a share in 1973.

Revenues reached $11.7 million compared with $9.5 million last year.

For the fourth quarter, Keydata lost $3.6 million or $1.32 a share compared with last year's earnings of $243,000 or 9 cents a share.

Revenues rose to $2.9 million from $2.6 million last year.

The time-sharing firm's new president, L. Edwin Donegan Jr., pointed out the special charge does not affect the company's basic economic position or strength now or in the future, including its cash requirements.

Revenues Climb 72% at MSI Data

COSTA MESA, Calif. – MSI Data Corp., maker of portable electronic ordering devices and supermarket point-of-sale units, weighed in with hefty improvements in its second-quarter and six-month results.

For the quarter ended Sept. 28, earnings rose 49% to $423,564 or 22 cents a share compared with $283,469 or 15 cents a share for the same period last year.

Revenues for the quarter showed a 72% gain to $8.5 million from $4.9 million in the same year-ago period.

In the six months, earnings rose 50% to $742,250 or 38 cents a share compared with $495,884 or 25 cents a share in the 1973 period.

Revenues jumped 76% to $16 million from $9.1 million last year.

80% Market Share

President William Bowers said the firm registered impressive second-quarter gains in the face of a troubled economy because MIS products typically reduce operating costs for a broad range of users.

MSI claims to have captured more than 80% of the current market for portable electronic ordering devices.

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We are a public company seeking to expand our existing computer lease portfolio. Will consider only 3rd generation IBM equipment, whether or not under lease. Must have "good mix" of CPU's and peripheral equipment. If you are "realistic" in your evaluation and are interested, please write on your company's letterhead to our representative,

FAULKNER, DAWKINS & SULLIVAN SECURITIES CORP.
1 New York Plaza
New York, New York 10004
Att: Mr. Paul Luftig, Chairman

Earnings Reports

ELECTRONIC ENGINEERING OF CALIFORNIA
Three Months Ended Sept. 30

	1974	1973
Shr Ernd	$.42	$1.54
Revenue	4,707,000	3,372,000
Disc Op	.....	(37,000)
Spec Cred	.....	a712,000
Earnings	260,000	945,000
9 Mo Shr	1.37	1.98
Revenue	14,074,000	9,485,000
Disc Op	.....	(245,000)
Spec Cred	.....	a712,000
Earnings	841,000	1,219,000

a-Gain on sale of Dimetrics, Inc.

GRAHAM MAGNETICS
Three Months Ended Sept. 30

	1974	1973
Shr Ernd	$.30	$.27
Revenue	3,925,696	3,337,460
Earnings	279,974	252,448

COMPUTERVISION
Three Months Ended Sept. 30

	1974	1973
Shr Ernd	$.19	$.18
Revenue	7,027,000	4,368,000
Earnings	440,000	405,000
9 Mo Shr	.66	.47
Revenue	19,352,000	11,451,000
Earnings	1,520,000	1,053,000

MODULAR COMPUTER SYSTEMS
Three Months Ended Sept. 27

	1974	1973
Shr Ernd	$.19	$.18
Revenue	6,795,000	3,296,000
Tax Cred	.....	190,000
Earnings	522,000	400,000
9 Mor Shr	.57	.45
Revenue	17,807,000	8,285,000
Tax Cred	188,000	454,000
Earnings	1,598,000	957,000

NASHUA
Three Months Ended Sept. 27

	1974	1973
Shr Ernd	a$.66	$.59
Revenue	83,529,000	57,681,000
Earnings	a3,037,000	2,670,000
9 Mo Shr	a2.31	1.86
Revenue	238,293,000	162,043,000
Earnings	a10,64 ,000	8,439,000

a-Includes charge of $500,000 due to Australian currency devaluation.

SPERRY RAND
Three Months Ended Sept. 30

	1974 (000)	1973 (000)
Shr Ernd	$.86	$.75
Revenue	721,893	a633,942
Earnings	29,507	25,649
6 Mo Shr	1.63	1.43
Revenue	1,431,577	a1,235,951
Earnings	56,146	49,151

a-Restated.

DECISION DATA
Three Months Ended Aug. 31

	1974	1973
Shr Ernd	$.11	.....
Revenue	10,758,000	$4,908,000
Earnings	413,000	(245,000)
9 Mo Shr	.22	.....
Revenue	27,924,000	12,211,000
Earnings	824,000	(927,000)

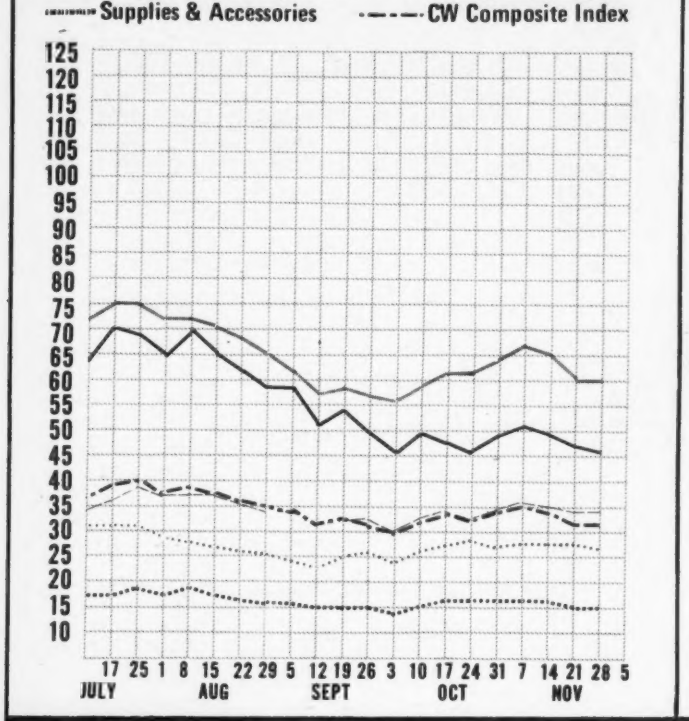
TECHNALYSIS
Three Months Ended Sept. 30

	1974	1973
Shr Ernd	$.65	$.55
Revenue	389,599	321,377
Earnings	35,887	30,500
9 Mo Shr	.18	.15
Revenue	1,114,440	1,001,845
Earnings	99,287	83,500

COMPUGRAPHIC
Year Ended Sept. 28

	1974	1973
Shr Ernd	$2.62	$1.91
Revenue	61,413,000	47,084,000
Earnings	4,804,000	3,484,000
3 Mo Shr	.66	.55
Revenue	15,565,000	13,332,000
Earnings	1,201,000	995,000

COMPUTERWORLD Computer Stocks Trading Indexes



Computerworld Sales Offices

Vice President — Marketing
Neal Wilder
Sales Administrator:
Dottie Travis
COMPUTERWORLD
797 Washington Street
Newton, Mass. 02160
Phone: (617) 965-5800
Telex: USA-92-2529

Northern Regional Manager
Robert Ziegel
Account Manager
Mike Burman
COMPUTERWORLD
797 Washington Street
Newton, Mass. 02160
Phone: (617) 965-5800
Telex: USA-92-2529

Eastern Regional Manager
Donald E. Fagan
Account Manager
Frank Gallo
COMPUTERWORLD
2125 Center Avenue
Fort Lee, N.J. 07024
Phone: (201) 461-2575

Los Angeles Area:
Bob Byrne
Robert Byrne & Assoc.
1541 Westwood Blvd.
Los Angeles, Calif. 90024
Phone: (213) 477-4208

San Francisco Area:
Bill Healey
Thompson/Healey Assoc.
1111 Hearst Bldg.
San Francisco, Calif. 94103
Phone: (415) 362-8547

Japan:
Ken Suzuki
General Manager
Dempa/Computerworld
1-11-15 Higashi Gotanda
Shinagawa-ku, Tokyo 141
Phone: (03) 445-6101
Telex: Japan-26792

United Kingdom:
Michael Young
c/o IDC Europa Ltd.
140-146 Camden Street
London NW1 9PF, England
Phone: (01) 485-2248
Telex: UK-26-47-37

West Germany:
Otmar Weber
Computerworld GmbH
(8) Muenchen 90
Tegernseer Landstrasse 300
West Germany
Phone: (089) 690-70-52
Telex: W.Ger-52-81-08

TRADE*QUOTES

Computerworld Stock Trading Summary

All statistics compiled, computed and formatted by TRADE*QUOTES, INC. Cambridge, Mass. 02139

EXCH		1974 RANGE (1)	CLOSE NOV 27 1974	WEEK NET CHNGE	WEEK PCT CHNGE
	COMPUTER SYSTEMS				
N	BURROUGHS CORP	63-217	82 3/8	+4 3/8	+5.6
O	COMPUTER AUTOMATION	3- 14	3	0	0.0
N	CONTROL DATA CORP	13- 38	12 1/2	- 1/8	-0.9
N	DATA GENERAL CORP	13- 38	16 1/2	- 1/8	-0.7
O	DATAPOINT CORP	6- 15	6 1/2	0	0.0
O	DIGITAL COMP CONTROL	2- 5	1 7/8	- 1/4	-11.7
N	DIGITAL EQUIPMENT	51-121	59 1/2	+1 7/8	+3.2
N	ELECTRONIC ASSOC.	2- 3	1 5/8	0	0.0
A	ELECTRONIC ENGINEER.	5- 11	4 7/8	- 1/2	-9.3
N	FOXBORO	19- 48	29 3/8	+4 3/8	+17.5
O	GENERAL AUTOMATION	8- 40	8 3/4	+ 1/2	+6.0
O	GPI COMPUTER CORP	1- 2	1/8	- 1/8	-50.0
N	HEWLETT-PACKARD CO	54- 90	58 1/8	+ 3/8	+0.6
N	HONEYWELL INC	20- 86	20 3/8	- 5/8	-2.9
N	IBM	152-251	178 1/4	+6 3/4	+3.9
O	INTERDATA INC	8- 22	13 1/4	+ 1/4	+1.9
O	MICRODATA CORP	2- 5	1 3/4	0	0.0
N	NCR	16- 40	16 7/8	+ 1/2	+3.0
N	RAYTHEON CO	21- 39	26	+2 1/8	+8.9
N	SINGER CO	12- 40	12 3/8	- 7/8	-6.6
N	SPERRY RAND	24- 44	28	+2 1/8	+8.2
A	SYSTEMS ENG. LABS	1- 3	1 1/4	+ 1/4	+25.0
N	TEXAS INSTRUMENTS	60-115	74	+ 3/8	+0.5
O	ULTIMACC SYSTEMS INC	1- 2	7/8	- 1/8	-12.5
N	VARIAN ASSOCIATES	6- 13	7	0	0.0
N	WANG LABS.	7- 20	8 1/4	- 3/8	-4.3
N	XEROX CORP	56-127	59 3/4	+4 1/8	+7.4
	LEASING COMPANIES				
O	BRESNAHAN COMP.	2- 2	2 1/8	0	0.0
O	COMDISCO INC	1- 7	1	0	0.0
A	COMMERCE GROUP CORP	3- 6	2 3/4	0	0.0
O	COMPUTER EXCHANGE	1- 1	1/8	0	0.0
A	COMPUTER INVSTRS GRP	1- 4	1/2	- 1/8	-24.9
O	COMP. INSTALLATIONS	1- 1	1/4	0	0.0
M	DATRONIC RENTAL	1- 1	3/4	0	0.0
A	DCL INC	0- 1	1/4	0	0.0
N	DPF INC	2- 5	2 3/4	0	0.0
O	EDP RESOURCES	2- 3	3 1/4	0	0.0
A	GRANITE MGT	1- 3	1 1/8	- 1/8	-10.0
A	GREYHOUND COMPUTER	2- 6	2 1/4	- 1/8	-5.2
A	ITEL	3- 6	3 3/4	- 1/8	-3.2
N	LEASCO CORP	5- 12	6 3/4	- 1/8	-1.8
O	LEASPAC CORP	0- 2	5/8	0	0.0
O	LECTRO MGT INC	1- 1	1/8	- 1/8	-50.0
O	NRG INC	1- 5	1 3/4	0	0.0
A	PIONEER TEX CORP	2- 10	2 1/2	- 1/4	-9.0
A	ROCKWOOD COMPUTER	1- 1	1/2	0	0.0
N	U.S. LEASING	5- 24	10 1/4	+ 1/4	+2.5
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	1- 2	5/8	- 1/8	-16.6
A	APPLIED DATA RES.	1- 3	1	- 1/8	-11.1
O	APPLIED LOGIC	1- 1	1/8	0	0.0
N	AUTOMATIC DATA PROC	21- 57	33 5/8	+6	+21.7
O	BRANDON APPLIED SYST	1- 1	1/4	0	0.0
O	CENTRAL DATA SYSTEMS	4- 6	3	0	0.0
O	COMPUTER DIMENSIONS	1- 3	1 3/4	0	0.0
O	COMPUTER HORIZONS	1- 5	1 1/4	0	0.0
O	COMPUTER NETWORK	1- 2	1/2	0	0.0
N	COMPUTER SCIENCES	2- 4	2 1/4	+ 1/8	+5.8
O	COMPUTER TASK GROUP	1- 1	3/8	0	0.0
O	COMPUTER TECHNOLOGY	1- 1	1/2	0	0.0
O	COMPUTER USAGE	2- 4	2	0	0.0
O	COMRESS	1- 1	1/4	0	0.0
O	COMSHARE	2- 4	3 3/4	+ 5/8	+20.0
N	CORDURA CORP	1- 4	1 1/8	- 1/8	-10.0
O	DATATAB	1- 3	1	0	0.0
A	ELECT COMP PROG	1- 1	1/4	- 1/8	-33.3
N	ELECTRONIC DATA SYS.	11- 25	14 3/8	+ 5/8	+4.5
O	INFONATIONAL INC	1- 2	1/4	0	0.0
O	I.O.A. DATA CORP	1- 1	1/4	0	0.0
O	IPS COMPUTER MARKET.	1- 1	1/2	0	0.0
O	KEANE ASSOCIATES	2- 4	1 3/4	0	0.0
O	KEYDATA CORP	1- 6	2	+ 1/8	+6.6
O	LOGICON	2- 5	2 1/2	0	0.0
A	MANAGEMENT DATA	1- 2	1 1/4	0	0.0
O	NATIONAL CSS INC	6- 37	6 1/2	+ 1/2	+8.3
O	NATIONAL COMPUTER CO	1- 1	1/4	0	0.0
A	ON LINE SYSTEMS INC	18- 30	17	- 3/8	-2.1
N	PLANNING RESEARCH	2- 3	2 1/8	0	0.0
O	PROGRAMMING & SYS	1- 1	1/2	0	0.0
O	RAPIDATA INC	1- 5	1 3/4	- 1/4	-12.5
O	SCIENTIFIC COMPUTERS	1- 1	1	0	0.0
O	SIMPLICITY COMPUTER	1- 1	5/8	0	0.0
O	TCC INC	1- 1	1/8	0	0.0
O	TYMSHARE INC	6- 12	6 3/4	0	0.0
O	UNITED DATA CENTER	2- 4	2 3/4	+ 1/8	+4.7
A	URS SYSTEMS	2- 4	1 7/8	- 1/8	-6.2
N	WYLY CORP	2- 5	2	+ 1/8	+6.6
	PERIPHERALS & SUBSYSTEMS				
N	ADDRESSOGRAPH-MULT	4- 11	3 7/8	0	0.0
O	ADVANCED MEMORY SYS	1- 7	1 1/4	- 1/4	-16.6
N	AMPEX CORP	3- 5	3 1/4	+ 1/8	+4.0
O	ANDERSON JACOBSON	2- 4	1 1/2	- 1/4	-14.2
O	BEEHIVE MEDICAL ELEC	2- 7	2 1/2	- 3/8	-13.0
A	BOLT,BERANEK & NEW	5- 9	5	+ 1/8	+2.5
N	BUNKER-RAMO	4- 8	4 1/4	0	0.0
A	CALCOMP	5- 11	5 1/4	0	0.0
O	CAMBRIDGE MEMORIES	4- 16	4	- 1/8	-3.0
O	CENTRONICS DATA COMP	7- 23	11 1/4	- 3/8	-3.2
O	CODEX CORP	8- 15	14 1/2	+2 1/4	+18.3
O	COGNITRONICS	1- 2	3/8	- 1/4	-40.0
O	COMPUTER COMMUN.	1- 2	1/2	0	0.0
A	COMPUTER EQUIPMENT	1- 2	1 1/8	- 1/4	-18.1
O	COMPUTER MACHINERY	1- 5	1 7/8	+ 1/4	+15.3
O	COMPUTER TRANSCEIVER	1- 2	5/8	- 1/8	-16.6
N	CONRAC CORP	10- 22	11 7/8	+ 1/4	+2.1
O	DATA ACCESS SYSTEMS	2- 3	2 1/2	0	0.0
O	DATA 100	5- 13	5 5/8	- 1/4	-4.2
A	DATA PRODUCTS CORP	3- 4	2 5/8	- 1/8	-4.5
O	DATA RECOGNITION	1- 1	1/4	0	0.0
O	DATA TECHNOLOGY	2- 4	1 3/4	0	0.0
O	DECISION DATA COMPUT	3- 13	3 3/4	+ 1/4	+7.1
O	DELTA DATA SYSTEMS	1- 2	5/8	0	0.0
O	DI/AN CONTROLS	1- 2	1/2	0	0.0
N	ELECTRONIC M & M	1- 4	1 1/4	0	0.0
O	FARRI-TEK	1- 3	5/8	0	0.0
O	GENERAL COMPUTER SYS	1- 4	1 3/4	0	0.0
N	GENERAL ELECTRIC	30- 65	36 3/8	+2 1/8	+6.2
N	HAZELTINE CORP	3- 7	2 1/2	- 1/4	-9.0
O	INFOREX INC	2- 5	1 7/8	0	0.0
O	INFORMATION DISPLAYS	1- 1	1/8	0	0.0
O	INFORMATION INTL INC	6- 14	6 1/4	- 1/4	-3.8
A	LUNDY ELECTRONICS	3- 3	2 7/8	0	0.0
O	MANAGEMENT ASSIST	1- 1	1/8	0	0.0
N	MEMOREX	2- 5	2 3/8	- 1/4	-9.5
A	MILGO ELECTRONICS	6- 18	7 3/4	0	0.0
N	MOHAWK DATA SCI	1- 4	1 1/2	0	0.0
O	ODEC COMPUTER SYST.	1- 3	1 1/4	+ 1/4	+25.0
O	OPTICAL SCANNING	3- 6	2	0	0.0
O	PERTEC CORP	2- 6	1 7/8	+ 1/8	+7.1
A	POTTER INSTRUMENT	1- 5	1 3/4	0	0.0
O	PRECISION INST.	1- 3	3/4	0	0.0
O	QUANTOR CORP	2- 8	2 1/2	+ 1/4	+11.1
O	RECOGNITION EQUIP	2- 5	2 1/8	- 1/4	-10.5
N	SANDERS ASSOCIATES	2- 8	2 1/2	0	0.0
O	SCAN DATA	1- 2	3/4	- 1/8	-14.2
O	STORAGE TECHNOLOGY	7- 15	7	- 1/8	-1.7
O	SYCOR INC	4- 13	5 1/4	- 3/4	-12.5
O	TALLY CORP.	1- 4	1 1/8	0	0.0
O	TEC INC	2- 7	2 1/4	0	0.0
N	TEKTRONIX INC	20- 48	21 3/8	+1 3/8	+6.8
N	TELEX	3- 4	3 3/8	+ 1/4	+8.0
O	WANGCO INC	4- 13	4 1/8	0	0.0
O	WILTEK INC	1- 8	1	- 1/2	-33.3
	SUPPLIES & ACCESSORIES				
O	BALTIMORE BUS FORMS	4- 6	4 1/2	0	0.0
A	BARRY WRIGHT	4- 7	4 1/2	+ 1/4	+5.8
O	CYBERNATICS INC	1- 2	1/2	0	0.0
A	DATA DOCUMENTS	23- 54	34 3/8	+3 1/2	+11.3
O	DUPLEX PRODUCTS INC	6- 17	15 1/8	+1 1/8	+8.0
N	ENNIS BUS. FORMS	4- 7	4 3/4	+ 1/8	+2.7
O	GRAHAM MAGNETICS	6- 11	6 3/4	0	0.0
O	GRAPHIC CONTROLS	6- 11	8 1/4	- 1/4	-2.9
N	3M COMPANY	47- 79	52 1/8	- 3/4	-1.4
O	MOORE CORP LTD	33- 57	39 1/2	+1 1/4	+3.2
N	NASHUA CORP	23- 45	23 1/2	+ 3/4	+3.2
O	REYNOLDS & REYNOLD	7- 35	8	0	0.0
O	STANDARD REGISTER	10- 16	11 3/4	- 1/2	-4.0
O	TAB PRODUCTS CO	5- 11	5	- 1/4	-4.7
N	UARCO	13- 23	17 7/8	+ 5/8	+3.6
A	WABASH MAGNETICS	3- 7	3 1/8	- 1/2	-13.7
N	WALLACE BUS FORMS	14- 24	15 1/2	- 1/8	-0.7

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
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(1) TO NEAREST DOLLAR

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Microdata